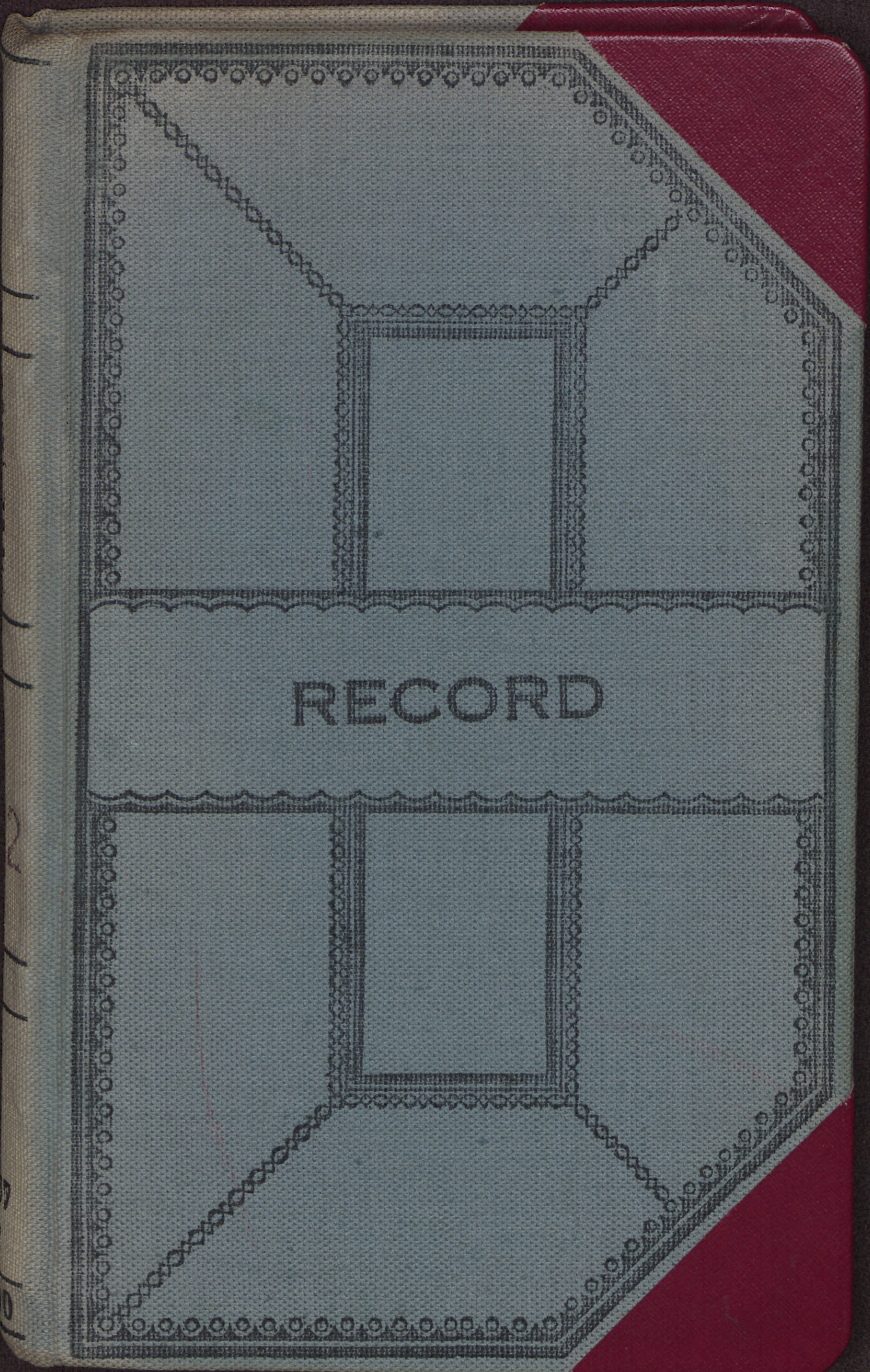

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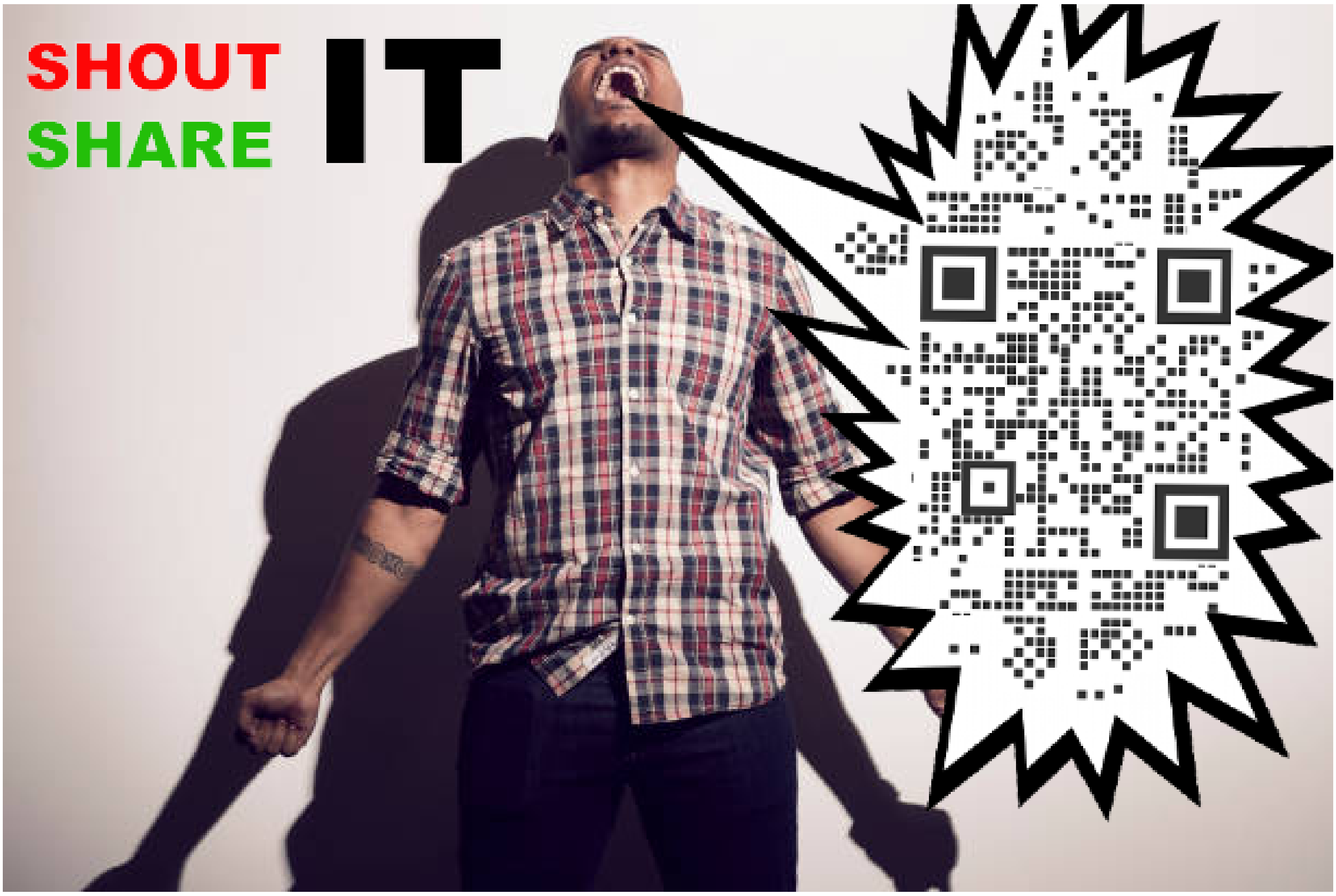
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Holt

erritorial Forester.

Collection and Field Note Book

No. 62

(June 29, 1961 - Sept. 23, 1961)

(41862 -- 42180)

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8/14, 1961 Walter M. Holt
Territorial Forester.

HAW'N PRINTING

Locality usually
fato follows date

Locality - Specific name
or distance or direction

Occurence - Environment
or how plants grow.

Specific description
is remark

Jatropha urens L.
Chenop. ambrosioide L.
Port. grandiflora ~~Hook~~.
Mentha spicata L.
Cyperus planifolius
L. C. Rich.

Cymodocea
manatorum Asch.

but see
Syringodium
filiforme Kütz.
Jour. Bot. Ap. 1939

Tell Walker of
Syringodium isoetifolium (Asch.) Dandy
Jour. Bot. 77:116, 1939

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42180

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1941 Louisiana

June 29 - New Orleans to
Merida - Jct.

Mississippi Delta has a great proportion of water, in pools, lakes, channels and innumerable straight ditches. Near New Orleans pools and channels are largely lined or covered by a pale green floating plant very probably Eichhornia crassipes. Farther west and south this disappears and the dark water does not seem to have any vegetation in it. The lakes here are larger. The ditches have enlarged ends. White sand(?) lines many of them.

1961 Mexico - Yucatan

June 29 -
Alacran Reef, from air.
regular unbroken reef front to n.e.
Two small sand bars, one with a bit of vegetation on west side. Lagoon is mostly filled with a maze of reefs. Four cays on south side, east third, all vegetated, but only the larger are densely so. No real open water in lagoon, but more open water in west south part and in extreme southeast part.
Islets are very small.

Yucatan
Barrier beaches with white sand, scattered clumps of vegetation then thin dull green scrub with some sand showing in a sort of reticulum thus gradually getting greener and denser with only cow paths showing. Then large cleared fields, in varying degrees of revegetation. Small clearings. Then obvious plantation patterns,

but this apparently not cultivated, or only partly so. Many abandoned fields ~~near~~ toward Merida. ~~Near~~ Nearer Merida much apparent scrub forest. Some sisal (?) plantations, many small bare fields, gardens, large fallow fields. Some bare reddish or white ground showing in scrub forest. This locally closed, locally open. Much cutting and burning. Extensive areas of sisal.

1961 Mexico

June 30 – Alacran Reef
Perez I.

Lighthouse built 1900 Dec. 15 acc. a plaque on the foundation.

Casuarina planted in 1918 or 1920.

Sr. Cabañas has been here caring for the light for 29 years.

From the top of the light house one sees that Suriana has spread over most of the island. A strip along the west side has clumps of Tournefortia, probably has been added, as have horns projecting to leeward at both ends. These disappear during seasons when winds are from west reappearing during trade wind seasons.

Casuarina, Cordia sebastena (leafless but flowering), Coccoloba have been planted, acc. Sr. Cabañas, also a patch of Opuntia to north of the light.

Sooty tern rookery occupies interior north of light.

Yucatan

Casuarina planted around buildings and a row to north scattered ones to south. Apparently do not establish themselves from seed. at least not much.

Enormous numbers of sooty terns on ground, many noddies nesting in Suriana bushes and Casuarina. Appear to be common noddy, but rather light colored.

Nests of Suriana twigs, bulky and poorly formed. a few have eggs and nearly hatched young, some fully feathered out young.

Many young sooty terns, almost full grown and fully feathered but scarcely able to fly. Breasts dark, anal parts pale gray, back black, barred with buff to white on feather tips.

Farther south hundreds of frigate birds sitting on Suriana.

Interior of south part of island entirely covered by an open scrub of Suriana, some of it more or less dead from effects of enormous numbers of bird — feathers all over bushes, globs of guano. Even the sooty terns roost in hundreds on the bushes, though in tens of thousands in spaces between. Guano pile made by frigate birds (photo.)

One noddy nest ornamented by 25-30 shell halves + some fragments.

No ground flora at all.

Inner beach has apparently been added to, as upper slope 4 m or so wide, has no Suriana. but has scattered plants ~~as~~ of Euphorbia buxifolia, mats of Sesuvium, rounded clumps of Atriplex, dry skeletons of Cakile, etc. becoming more luxuriant toward the south point, where

there is a small secondary lagoon surrounded by gravel bars with only a very sparse vegetation. The pond opens to the lagoon. At its inner, seaward end, are a few shrubs of Avicennia, and luxuriant mats of Sesuvium.

On the gravel bar, made up of worn Acropora fragments, Euphorbia buxifolia, on wider parts a few tiny shrubs of Suriana, several ~~one~~ of Tournefortia, one of Atriplex, some larger dead bushes of Tournefortia(?). Locally quite a few Suriana seedlings. Small flock of turnstones? and a smaller noddy
(4) with head only slightly paler but with sharp white lines over eyes.

Cakile skeletons locally abundant on end of hook.

On tiny bar islet beyond this one sesuvium plant.

Two sea grasses -
Thalassia (wide lvs.)
and Diplanthera ? (narrow)
piled up in quantities
in embayments in this
secondary lagoon.
Thalassia testudinum
Diplanthera wrightii

June 30 - south end of
Perez Islet, Alacran atoll
On upper part of
lagoon beach.

41 8 62 Euphorbia buxifolia Lam.
2
common

5 63 Cyperus planifolius
rare

5 64 Cakile edentula var. alacranensis
common

5 65 Euphorbia buxifolia
common

5 66 Avicennia germinans (L.) Stearn
very local, one small
colony on shore of small
pond in secondary lagoon.

No guano at all seen
accumulated in sooty
tern rookery, except where
frigate birds roost.

Diplanthera growing
abundantly locally
at low tide level on
lagoon shore.

Small dark heron seen
on one of lagoon bars.

branches ascending.

Tufts, culms spreading.

All seen were dead
and in fruit - a truly
annual species.
very ~~deeply root~~
large root system,
lactiferous dwarf shrub.
thickly branched
shrub 2.5 m. tall; leaves
very glaucous beneath;
flowers cream white
with pale orange-yellow tube,
inflorescence blackish.

Sooty terns not seen
defecating in air over
land, but noddies were
some.

This has been a very severe dry season. Many of the plants show it. Hard to tell if effects seen, esp. the poor condition of much of the Suriana, is due to rain or birds.

Planted species are, acc. Sr. Cabañas, Casuarina equisetifolia, Cordia sebastena, Coccoloba uvifera, and Opuntia dillenii. Coconuts also planted at various times but haven't grown.
A row of small Crinum sp. planted near house.

July 1 - Perez I.
Opposite lighthouse on lagoon shore is a lobe of sand flat with sparse vegetation of Euphorbia, Tournefortia, and sapling of Suriana up to .7 m. tall - one large mat of Sesuvium that is almost dead - a few stems only still green. dead Cakile.
Sand lobe surrounded by small beach ridge very low.

Photo of noddies roosting on dead Suriana bush, lagoon shore. These bushes undercut by wave erosion on this stretch of beach s. of sand lobe. (photo)

The Sesuvium has rather light pink flowers, a little, but very little red pigment in stems, erect somewhat compressed, not glossy but not conspicuously dull leaves.

South end of islet - panoramic series of photos of seaward lobe taken from near head of secondary lagoon with Avicennia.
Series of small gravel beach ridges curving out to form a lobe.
The lobe, itself is bare and white.
Back of it the parallel ridges are largely covered by an open stand of dwarf scrub of Euphorbia. A large bush of Avicennia in edge of open Suriana scrub back of the Euphorbia.

The lobe is built out around a couple of ponds, which are partly filled by gravel sheets. (photos). On the absolutely white acropora gravel a few spreading tufts of Cyperus. No other plants. On the core of the lobe, between the 2 ponds, (a) Euphorbia, & Tournefortia. Suriana scattered half way out.

One dead Cakile plant with the Cyperus.

Toward end of lobe are areas where numerous Cyperus seedlings and even some older clumps, and some Euphorbia and Tournefortia are dead or dying. Appears to be where there has been some recent wash over of salt water. Probably concentration of salt by evaporation has killed the plants.

In some fresh ~~fill~~ sand beach surfaces the top cm. or so is pale green, but surface is pinkish white.

In largest pond 1 m or less deep. a profusion of fine diffuse green algae, some Diplanthera.

Two turtle burrows on sand.

Toward base of lobe Euphorbia is much more green and luxuriant than seen anywhere else. Two plants of Cakile are green, several dead.

Along first part of seaward coast a ridge seems to have been added, sloping toward a 'trough' just outside the Suriana. Seaward part of it then cut away. ~~[illegible]~~ A few Euphorbia on landward slope, fair sized plants.

Back of this, which is perhaps 10 m. wide, is a terrace or berm 12-14 m. wide with an ~~[illegible]~~ irregular open dwarf scrub of Tournefortia with, at south end and near lighthouse, scattered bushes of Suriana 1-~~1½~~ 2 m. tall. 1 sooty tern egg on sand.

This is about 1-1.5 m lower than the edge of the main Suriana covered flat of the island. (photos)

This edge is really a miniature dune ridge, sand caught by the Suriana. Inside the flat is much lower, with open Suriana scrub 1 m. tall, partly dead. (photos)

A few large seeds - several kinds, on seaward beach. Cakile and Tournefortia abundant near parent plants.

North of lighthouse -
Open planting of Casuarina to 5-8 m. tall, in an open scrub of Suriana about 1.5-2 m. tall, except near beach, partly or mostly dead. Enormous numbers of sooty terns in the bushes and on ground - ground smooth and packed. No ground flora at all. (photos)
Several patches of Opuntia dillenii forming a dense scrub 0.7-1 m. high. (photos)
Noddy nest of twigs

piled almost 1 m. (photos)

Most of lagoon beach north of light has a broad low beach ridge completely occupied by Suriana. This is greener on beach ridge than in interior.
Near north end, where it begins to curve seaward, there is some open sand on lagoonward slope of ridge on this are scattered Euphorbia tufts, some of them quite green, and dead Cakile. Locally some dead tufts or bases of Cyperus, up on berm.

Quantities of dry Thalassia blown inland, mixing with dead Suriana leaves to make up the litter. Some Sargassum also.

At the north end are two sand lobes - one small one on the lagoon corner, a large one on the seaward

Tr 11.18

July 1 - Perez I., Alacran Reef (atoll)

on nearly bare sand terrace on seaward side, south end.

41867 5 Portulaca oleracea L.;
occasional

5 68 Cakile edentula var. alacranensis (Millsp.) Schulz
only two green plants seen, numerous dead ones.

1 69 Tournefortia gnaphalodes R. Br.
abundant on beach terrace.

July 2 Perez I. Alacran
on narrow sand terrace at top of beach along secondary lagoon or pond at south end.

5 70
5 71 Atriplex pentandra (Jacq.) Standl.
common

forming ~~m~~meadows on bottom of pond.

5 72 Thalassia testudinum Kon. + Sims
abundant,

5 73 Diplanthera wrightii (Asch.) Asch.
abundant

edge of small pond just at high tide level

5 74 Sesuvium portulacastrum L.
locally abundant

to p. 26

stamens 17–22

flat mats, leaves
— rather thin; fls. yellow, less than 1 cm. across, petals emarginate
fleshy, branched from near base.

dried fruits abundant on ground.

rounded clumps. much branched from base.

forming a dense sod
— with tangled rhizomes
forming a dense sod with tangled rhizomes.

fleshy, ~~rhizomes~~ green, only slightly reddish at nodes, stems prostrate with ascending or erect branches, leaves somewhat compressed, not or scarcely glossy; flowers purplish pink.

corner, this one ending in a very narrow almost straight sand horn, this being eroded away by lagoon waves.

(Photos of the open Tournefortia scrub vegetation of the large lobe, bordered by ~~dw~~ open dwarf scrub of Euphorbia, and of sand horn, and of wave erosion cliff about 3 dm. high along north shore. Also of bare strip a~~long~~ beach seaward ~~o~~ shore, in front of Tournefortia belt.)

A very few scattered Suriana bushes are in ~~this~~ the Tournefortia scrub on the lobe. The scrub generally is about 0.5–1 m high, open, of round spreading patches separated by sand. A few Euphorbia clumps in the open. Also much dead Cakile especially on bare flats near shore. The Tournefortia does not come very close to shore in some places.

No vegetation on the sand horn except that the upper

few mm. of the sand are greenish with algae. This is where sand is wet by sea water.

Some open areas in the Tournefortia scrub are occupied by an open dwarf scrub, 3-4 dm tall, of Euphorbia, much affected by drought, rather dry looking, some bushes dead.

Much open sand here, all white, no algal crust at all, nor any darkening by algae. The sand is fine but with some admixture of shells and coral gravel.
Some unhealthy spreading Cyperus tufts.

This whole lobe, about 100 m. long, from base of horn, to edge of tall Suriana scrub, gives impression of being much younger land, probably deposited after Millspaugh's visit.

Along seaward side a broad beach ridge or low dune ridge, about 1 m high, 25 m. wide, covered by Suriana scrub 2–2.5 m tall mostly green.

Outside this is a very shallow depression and slope up to a low beach-ridge, forming a flat about 50 m wide, from edge of Suriana scrub to top of beach. This is occupied by widely scattered Tournefortia patches, scattered Suriana bushes, an abundance of dead Cakile (one green plant seen), a few large flat plants of Portulaca, a few poor ~~patches~~ tufts of Cyperus, a very few Euphorbia bushes. The woody vegetation much sparser toward beach. Cakile abundant there. (photos ending roll 3 of this flat.) (Those before of birds in Suriana scrub and on Casuarina trees.)

Near north end, about 30 m in from top of beach on the flat are 3 large thick slabs of a compact limestone rock 50 cm or more long, half as wide, lying together.

3 graves at north end, one from 1901.

Along middle of seaward coast the Tournefortia clumps 3-5 m across seem to accumulate low mounds of sand. The dune ridge here is about 2 m. high, broad and rounded.

At night the sooty terns seem still to be resting on the ground and on bushes, making less noise than during the day. A strong light scares them up but they fly with much less screams than in daylight.

Ghost crabs are numerous along and just above the beach. All sizes up to 15 cm. across between leg tips. If surprised near their own holes they dart down, but apparently don't care to go into any except their own, as they will run long distances when pursued. Sometimes in loose sand they will quickly wiggle down into the sand. Others simply freeze with eyes sticking up and will not move until touched.

Only one small Gecarcinus was seen, with bright red claws. It was sparring cautiously with a much larger Ocypoda.

July 2 - north of lighthouse buildings -

pit dug 68 paces from lagoon beach, 90 paces from seaward beach, on ground sloping gradually from dune ridge to lagoon beach.

1-2 cm. of loose dry sand and litter (from Casuarina) on top of a somewhat caked layer 1+cm. thick. First traces of moisture at 25 cm. from 25 to 90 cm. a layer of somewhat

mottled slightly darkened sand with numerous Casuarina roots. Below this a coarser sharper white sand with scattered rather rotten pieces of white coral.

The upper 10 cm. or so is finely and irregularly bedded with dark and pale layers

Sample 1 from upper 8 cm.
2 from mottled layer of about 25 cm.
3 from next 30 cm.
4 next 40 cm.
wet layer 5 there to H20
6 rocks & sand from wet layer

water at 5' 3"

Profile

3-10 cm. fine sand, thinly and irregularly bedded light and dark gray brown.

10-35 cm. medium fine sand, pale brown and yellow brown irregularly mottled first traces of moisture at about 25 cm. Suriang roots in this zone, up to 1 cm. thick.

35-65 cm. coarser pale sand with fine roots scattered through it.

65-105 cm. coarse sharp very pale sand

105-140 cm. coarse sharp white wet sand with scattered coral fragments.

Water level, at 12:10 p.m 133 cm. same at 3:30 water quite salty. (2 samples.) at 6 p.m 5'0

Trench in beach at about mid tide level - ~~of~~ seaward beach opposite hole. Mostly finger-like fragments of a small coral.
This extends back under a layer of dune sand or storm beach.
Interstices filled with fine sand with a little silt.

Toward lagoon from hole - about half way, at lowest level, the surface is caked with guano, but the layer is no more than ~~a cm~~. 1 cm. thick. Under it is 15 inches of dark gray brown ~~so~~ ~~to~~ loamy sand before it becomes pale.
During rainy weather, acc. local people, water runs to this place and soaks into ground.
Nearer beach the soil becomes progressively paler and sandier, coarser near beach.

1961 – Mexico – Yucatan

July 2. Perez Islet

41875 Suriana maritima L.
5 The dominant shrub over almost the whole island.

planted around lighthouse building,

6 76 Casuarina equisetifolia L.
common,

6 77 Cordia sébastena L.
common

6 78 Coccoloba uvifera L.
local, a few ~~tree~~ shrubs

1 79 Nopalea cochinellifera
two plants

growing on coral heads on patch reef in lagoon opposite Perez I.

1 80 Turbinaria
occasional.

July 3 Perez I.
planted in pots in an enclosure of bamboo.

1 81 ?
volunteer in pot of something else that did not grow

1 82 Jatropha urens L.

Cf. p. 68

Alacran

many stemmed much branched shrub 2 m. tall; trunks used as fuel by people.

small tree 6 m. tall. (all from one tree).

small tree, 3 m. tall, completely leafless (leafy branches from ~~very~~ young shrub 1.5 m. tall, not flowering), flowers brilliant orange-vermillion.

– very diffuse, sprawling
– shrubs 2 m. tall.

erect, 1 m. tall; fruit purplish red.

sterile, erect, unbranched seedling 5 dm. tall

shrub 1 m. tall leaves eaten, sap somewhat milky.

1961 Me~~xico~~ - Yucatan

Patch reef in lagoon opposite Perez I.

Roughly circular area 100 m. or so across, from 1.5 to 3 m. deep. more or less flat covered by broken pieces of Acropora cervicornis and fine silt to sand white sediment. Abundantly scattered over this are two or three types of brain corals reaching enormous size, 1-2 m. diam. attached to these are sea fans and gorgonea , also soft corals and an erect sparsely branched black gorgonean, all in abundance. Patches of Acropora cervicornis are common.

Halimeda, Dictyota, Turbinaria, and Cladophora are common. Penicillus in flats.

Diadema are very common in cavities, ~~and~~ crevices and interstices. Occasional Panulirus.

At least two kinds of Tube worms in and on the brain corals. one

Alacran

with a funnel shaped whorl of tentacles. the other with two conical spirals of very showy tentacles.

People say that the birds leave in Sept. and return in Feb.

They have a piece of pegmatite - quartz, felspar, muscovite, about 15 cm. in diam. that they say they ~~go~~ got off the lagoon bottom.

Birds - several boobies seen flying by. when we approached the island 2 blue fac. boobies flew by one Royal tern.

On Perez
1 heron
Frigate birds in hundreds
Noddies in thousands
Sooty terns in scores or hundreds of thousands.

July 3 - Perez I.

Observations on clouds coming from north east - several substantial clouds disappeared completely when over the atoll. (10 a.m. very slight wind.

Two slight showers came across the islet. The terns were much agitated, flying in the rain with much noise and apparently great eagerness.

Rainfall by days beginning Jan. 1, 1959 - from records of weather station on Alacran.

mm.

Jan. 1959	Feb.	Mar.	Apr.
20	0	5	0
0	0	0	0
0	0	0	0
0	0	0	0
21	0	0	0
8	1	8	0
0	0	0	0
18	0	2	0
0	0	0	0
0	0	0	0
0	1	0	0
0	0	0	2
0	0	0	1
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	4
0	0	0	0
0	0	5	0
0	0	0	0
0	20	0	0
7	0	0	0
0	0	0	0
0	0	0	0
1	0	0	0
0	0	0	0
0	0	0	0
0	4	0	0
5		0	0
0		0	0
0		0	

1961 - Mexico - Yucatan

May 1959	June	July	Aug.	Sept.
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	6
0	0	0	0	999 the ? gauge overflowed.
0	0	0	0	0
0	0	0	0	0
4	0	0	0	0
0	0	0	0	2
0	16	0	0	0
0	0	0	0	0
0	18	0	0	7
6	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	8
0	0	0	0	0
0	0	0	0	20
0	0	0	0	0
0	0	0	0	0
1	0	0	0	0
0	0	0	0	0
0	0	0	5	1
2	0	0	0	0
0		1	0	

Alacran

Oct. 1959	Nov.	Dec.	Jan. 1960	Feb.
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
9	0	0	0	0
0	3	0	1	0
0	0	0	0	0
9	0	0	0	0
0	0	0	0	0
~~11~~ 1	0	0	0	0
0	~~75~~ 99	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
3	4	0	0	0
0	0	0	0	0
0	22	0	0	0
0	3	0	0	0
0	0	0	0	0
1	0	5	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	
0		0	0	

1961 Mexico - Yucatan

Mar. 1960	Apr.	May	June	July
0	0	0	0	0
0	0	6	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	3
0	0	0	0	0
0	0	0	0	0
0	0	0	0	40
0	0	0	0	0
0	0	0	0	0
0	0	0	4	0
0	0	0	0	0
0	0	0	0	4
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	2	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	40	1	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0		0		0

Alacran

Aug. 1960	Sept.	Oct.	Nov.	Dec.
0	0	1	0	0
0	0	0	0	0
2	8	0	0	0
0	0	0	0	0
0	0	1	0	0
0	0	0	0	0
0	0	0	1	0
0	0	0	0	0
0	0	25	0	0
0	0	3	0	0
0	0	0	0	0
3	0	0	0	0
6	0	0	0	0
0	3	0	0	0
0	0	0	0	6
0	0	0	0	0
0	0	0	0	0
0	6	0	0	2
9	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	20	0
0	1	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	999
0	21	1	0	0
0	28	0	0	0
0	0	0	0	0
0	7	0	0	0
0		19		0

Jan. 1961	Feb.	Mar.	Apr.	May
0	0	0	0	0
0	0	0	0	0
0	1	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	9	0	0	0
0	0	0	0	0
999	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	29	0	0	0
0	0	0	0	0
0	0	0	0	0
3	~~0~~	0	0	0
0		0	0	0
0.		0		0

June 1961	July
0	0
0	0
0	0
0	0
0	0
0	0
0	
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0	
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3	
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1961 – Mexico – Yucatan

Wind directions, 3 times daily

Jan. 1959 1	Recalando NW — N	9	NNW NNW NNW	18	N NE NE	26	W W NW
2	SSE Recalando fuerte del SSW WSW	10	NE NE NE	19	ENE SE ESE	27	~~ENE~~ ENE E NNE
3	E Recalando W SE E	11	NE NE NE	20	SSE ESE E	28	NE NE NE
4	E E NE	12	~~ENE~~ ENE ENE ENE	21	SE SE NE	29	NE E ENE
5	N E NE	13	ENE ENE E	22	N N NW	30	E E NE
19 6	NE ENE NE	14 15	E ESE E SE SE llana	23	N NNE NNE	31	E E ENE
7	E SSE E	16	N NW NNW	24	NNE NNE NE		
8	NE W NW	17	NNW N NE	25	NE NE NE		

Alacran

U.S.F.W. Bull 39 1944

Feb. 1959 1	NE E NE	9	SE ESE E	17	N SW WNW	25	SE S NW
2	ENE E NE	10	SE ESE ENE	18	SE SE NW	26	SSE S NNE
3	E SE E	11	E E ENE	19	NE SSE NNE	27	S SSW NW
4	SSE S WNW	12	E E ENE	20	SE ESE NNE	28	NNE SW N con rachas de 80 kms. las 4 p.m.
5	~~Rec.d.W~~ Rec.d.W. Rec.d.W. Rec.d.W.	13	ESE E E	21	E E ENE		
6	NE NNE NNE	14	ESE E ENE	22	ENE NE		
7	E E ENE	15	SE SE N	23	ESE E ENE		
8	E ESE E	16	Rec.d W. Fuerte SE SE NW	24	SE E ENE		

Mar. 1959

1. NW WNW NW	9 ENE NNE NNE	17 SW ESE ESE	25 ESE E ENE
2. NNW NE E	10 E E E	18 ENE NE NE	26 SSW S S
3 SE E NE	11 ESE SE NE	19 N NW N	27 SSW SSW S
4 E E E	12 WSW NNW N	20 ENE ENE NE	28 SW S SSW
5 SE SE SE	13 NNE E E	21 SE S W	29 SW SW S
6 N N N	14 SE ESE E	22 NNW NW NNW	30 SE SE NNE
7 N NE NNE	15 SE SE NE	23 NW NNW NE	31 SE SE NE
8 NE ENE ENE	16 SE SE N	24 ENE E ENE	

Apr. 1959

SE 1. SE N	9 ESE ENE NE	17 E E ENE	25 NE ENE NE
2 NW NW NW	10 E E NE	SE 8 SE NE	E 24 E ENE
3 NNW SE N	E 11 SE N	SE 19 ESE NE	E ESE 27 ENE
4 ENE NE NE	SE 12 SE NE con rachas de 60 km.	SE 20 ESE ENE	SE 28 ESE ENE
5 E E NE	N 13 NNW N	SE 21 ESE NE	SE 29 ESE E
6 E E NE	N 14 NNE NE	ESE 22 NW N	30 SE E NE
7 E ENE ENE	NE 15 ENE ENE	N 23 N N	
8 E E ENE	E 16 NE NE	NNE 24 NE NNE	

May 1959

1	E	E	NE
2	E	E	NE
3	E	ENE	NE
4	E	E	ENE
5	E	E	ENE
6	E	ENE	NNE
7	ENE	NE	NE
8	NE	NE	NE
9	E	E	ENE
10	ESE	E	ENE
11	ESE	E	ENE
12	ESE	ENE	ENE
13	SE	Llana	NNE
14	N	NW	NNE
15	E	ENE	NNE
16	N	SE	NNE
17	SSE	ESE	ENE
18	SE	SE	ENE
19	SE	ESE	ENE
20	ESE	SE	ESE
21	ESE	E	E
22	E	E	NE
23	E	E	NE
24	E	NE	NE
25	ESE	E	NE
26	NE	E	NE
27	ENE	NE	NE
28	N	NW	NW
29	W	WSW	Llana
30	ESE	SE	E
31	SE	SE	E

June 1959

1	SE	ESE	NE
2	SE	E	NNE
3	ESE	ESE	NE
4	ESE	E	NE
5	SE	SE	NE
6	SE	SE	NE
7	SE	SE	ENE
8	Rec. fuerte del SE	SE	NE
9	SE	ESE	NE
10	SE	ESE	ENE
11	SE	E	NE
12	SE	E	~~NE~~ NNE
13	S	S	NNE
14	SE	SE	E
15	E	E	NE
16	SSE	SE	SE
17	SSW	WSW	WNW
18	SSW	WNW	N
19	SSE	WSW	NNE
20	SE	Calm	NE
21	SE	SE	ESE
22	ESE	ESE	E
23	ESE	E	E
24	E	E	E
25	E	E	E
26	~~ESE~~ ESE	E	E
27	ESE	E	E
28	E	ENE	ENE
29	ESE	E	NE
30	ESE	E	NE

July 1959

	E		SE		E		SE
	Calm	9	SE	17	ESE	25	SE
	NE		NE		NE		ENE
	ESE		ENE		ESE		SE
2	Calm		Calm		E		E
	NE		NNE		NE		ENE
3	Calm		SE		SE		ESE
	NE	11	Calm	19	SE	27	E
	ENE		NE		ENE		NNE
	E		SE		ESE		Llana
4	E		Calm		E		Llana
	NE		NNE		NE		NE
	ESE		SE		SE		E
5	ESE	13	E	21	SE	29	E
	NE		NE		ENE		E
	SE		ESE		ESE		ENE
6	Calm		SE		SE	30	ENE
	NE		NE		SE		NE
	E		SE		ESE		E
7	E	15	SE	23	E	31	E
	NNE		NE		ENE		E
	SE		ESE		E		
8	SE	16	E		ESE		
	NE		ENE		ENE		

Aug. 1959

	Llana		SE		ESE		E
	Llana	9	SE	17	E	25	E
	NNE		NE		ENE		ENE
	SSE		SE		E		SE
	Llana		SE		E		E
2	Llana		NE		NE		E
	SE		ESE		ENE		E
3	Llana	11	E	19	NNE	27	E
	NNW		NE		NNE		NE
	SE		SE		E		E
	Llana		SE		E		E
	N		NNE		ENE		NNE
	SSE		SE		E		Llana
5	S	13	SE	21	ENE	29	NW
	Llana		NE		NE		Llana
	SSE		SE		ESE		NW
	SE		ESE		E		NW
	ENE		ENE		ENE		Llana
	SE		E		ESE		Llana
7	Llana	15	ENE	23	E	31	SSE
	NE		E		E		NE
	SE		ESE		ESE		
8	ESE	16	E		E		
	NE		ESE		ESE rachas de 80 km.		

Sept. 1959

1	SE SE NE	9	SE Llana NNE	17	ENE SE NE	25	SE SE NE 1
	SE E ENE		Llana W N		ESE E NE		SE SE NE
3	ESE E ENE	11	SW SW Llana	19	NE ENE E	27	SE SE NE
	ESE ENE ENE		S SW WSW		E ESE NE		SE ENE NE
5	Llana E NE	13	S SW NW	21	E E E	29	E E NE
	E SSE N		NW SSE Rec. del W		ENE NE NNE	30	SE SE NE
7	ESE ESE NE	15	SSE SW WNW	23	E E NNE		
8	SE ESE NE	16	Llana N calma N	24	Llana SW NE		

Oct. 1959

1	SE SE NW	9	SE SE ESE	17	N NW NW	25	NW NNW NNW
	SE ESE NE	10	ESE E SE		NNW NNW N	26	E SE E
3	ESE E E		E ENE ENE	19	N N NE		ESE ESE ENE
	ESE E E	12	E E E (16 HS Turbonadas corriente 75 Km.)		N NNW NNW	28	SE S Calma
5	ESE E ESE		ESE E E	21	NW NW NNW		SE SE ENE
	SE SSE SE	14	SE SE ENE		Calma NE NE	30	ESE E ENE
7	SSE SW WSW		SE E NE	23	SE S Calma	31	ENE E NE
8	SSE W NNE	16	E ENE ENE	24	Calma W NW		

Nov. 1959	ENE	N	NE	NNW
	NE	N	17 N	25 N
	NNE	N	N	NE
	NNE	N	rec. fuerte del N	SE
	NNE	NNE	N	26 ESE
	NE	NNE	N	E
	SW	Calma	NNW	SE
	NE	"	19 NNE	WSW
	ENE	NNE	NNW	WNW
	SE	N	Calma	rec. muy fuerte del N
	ESE	S	SW	28 NNW
	E	Calma	WSW	NNW
	SE	Calma	W	NNW
	ESE	"	WNW	N
	NE	NNW	WNW	N
	NNE	Calma	WSW	N
	N	NNW	W	30 NNE
	rec. fuerte del N	NNW	Calma	NE
	"	NW	ESE	
	"	Calma	23 SE	
	N	"	ENE	
	N	Calma	S	
	N	E	24 SW	
	N	NNE	NW	

Dec. 1959	1. NE	9 E	17 SE	25 Calma
	NE	E	SE	"
	NNE	ENE	WNW	NE
	N	E	WNW	E
	NNW	10 NE	NW	26 ENE
	NWW	NE	NW	E
	NW	ESE	NW	ESE
	3. NW	SE	19 NW	ESE
	NNW	E	NNW	E
	WNW	SE	N	Calma
	N	12 SSE	N	28 NW
	NE	NNW	NNW	NNW
	Calma	NNE	NW	NNW
	5 SW	NE	21 NW	N
	Calma	NE	NNW	NNE
	W	E	NE	N
	NW	14 E	NE	30 NNE
	NW	ENE	ENE	NE
	NW	ESE	ENE	E
	7. NNW	ESE	23 Calma	31 E
	N	E	"	E
	NE	ESE	N	
	8 E	16 ESE	Calma	
	ENE	ENE	24 NW	

Jan. 1960	SE	ENE	SSE	SE
	SE	9 NE	SE	SE
	NE	NE	E	E
	SE	ENE	SSE	E
	SE	10 ENE	W	E
	E	NNE	rec. muy fuerte del N	ENE
	SE	NE	N	E
	3 SSE	ENE	NNW	E
	NNW	NE	NW	NE
	E	E	N	E
	E	E	NNW	E
	NE	Rec. fuerte del NE	NNW	ENE
	5 E	E	N	Calma
	E	E	N	SSW
	E	ENE	N	rec. fuerte del NW
	SE	ESE	N	WNW
	SE	ESE	N	rec. fuerte del W
	NNE	E	N	WNW
	N	SE	N	WNW
	Rec. del N	SSE	N	WNW
	N	N	N	NW
	N	E	ENE	
	8 NNE	ESE	ENE	
	NE	E	ENE	

Feb. 1960	NE	SE	ENE	WNW
	1 ESE	9 SE	17 SE	NW
	NE	E	N	N
	E	SE	NW	N
	2 SE	S	18 rec. muy fuerte d. NW	26 N
	NE	SW	NNW	NNE
	SE	ENE	N	NE
	SE	11 SE	NNE	NNE
	E	NE	NNE	NE
	4 SE	ESE	ENE	ESE
	SSE	ESE	20 E	28 E
	Calma	SW	ENE	NE
	NNW	rec. muy fuerte del W	ESE	E
	NNW	13 WNW	E	29 E
	NW	WNW	ENE	NE
			~~SW~~	
	NW	NNW	SW	
	6 WNW	N	22 S	
	NNW	NE	NE	
	NW	E	NNE	
	N	15 E	NNE	
	N	NE	NNE	
	N	ESE	ESE	
	8 NNE	WNW	ESE	
	NE	16 NNW	24 NE	

Mar. 1960	ENE	ESE	SSE	ESE
	ENE	ESE	Rec. del S	E
	ENE	NE	NNW	ENE
	ESE	SE	NNW	ESE
	ESE	SE	NNW	ESE
	NE	NE	NNW	ENE
	N	ESE	rec. del NNW	SE
	N	E	rec. del N	SE
	N	NNE	N	ENE
	NNE	NE	NNE	SE
	NNE	NE	NNE	ENE
	NNE	NE	NE	ENE
	NE	ENE	NE	SE
	NE	E	NE	SE
	NE	NE	NNE	NW
	NE	E	NNE	NE
	ENE	E	N	SSE
	NE	E	NNW	NNE
	NE	SE	NE	
	N	rec. del S	NE	
	NE	NNE	NE	
	NE	SE	E	
	ENE	SE	E	
	E	NNE	ENE	
			ESE	
			E	
			ENE	

Apr. 1960	SE	E	E	ESE
	E	E	E	E
	ENE	NNE	NE	NE
	ESE	NE	ENE	E
	ESE	NNE	NE	ENE
	NW	NNE	NNE	NE
	SSE	ENE	NE	E
	Calm	ENE	ENE	ENE
	N	NE	NE	ENE
	NW	E	E	NNE
	NW	E	E	ENE
	NW	ENE	NE	ENE
	NW	E	ENE	E
	NW	ENE	ENE	E
	NW	ENE	NNE	ENE
	NW	E	ENE	ESE
	NE	ENE	E	E
	NE	ENE	NNE	NE
	E	ENE	E	
	E	ENE	ENE	
	ENE	NE	NNE	
	ESE	E	E	
	E	E	E	
	ENE	NE	NNE	

May 19~~59~~60	ESE	NE		ESE	E
	ENE	NE		ENE	ENE
	NE	NNE		ENE	NE
	N	E		ESE	ENE
	SE	ESE		E	NNE
	SE	NNE		ENE	NNE
	SE	NNE		E	NE
	SE	NW		E	NE
	NNE	NNW		ENE	ENE
	SE	NNW	E	E	ENE
	E	NNW	E	ENE	NE
	ENE	NW	ENE	NNE	ENE
	ESE	WNW		E	NNE
	E	NNW		E	N
	ENE	NNE		NE	N
	SE	ESE		E	NE
	E	E		E	NNE
	ENE	NE		ENE	NE
	SSE	ESE		E	
	SW	E		E	
	NW	NE		NE	
	NW	E		ESE	
	NNW	ENE		E	
	N	ENE		ENE	

June 1960	NNE	NE	ESE	ESE
	NNE	N	ESE	E
	NE	NNE	NE	ENE
	E	NE	ESE	E
	NNW	NNE	ENE	E
	NNE	NNE	ENE	NE
	E	E	E	E
	NNW	E	ENE	NE
	N	ENE	ESE	NE
	E	NE	E	ENE
	NE	NE	E	NE
	NNE	NE	ESE	E
	E	ENE	ESE	ESE
	NE	ENE	E	ENE
	NNE	NE	E	NE
	ENE	ENE	E	E
	E	NNE	E	E
	NNE	NE	E	ENE
	E	ENE	ESE	
	E	NE	ESE	
	NNE	ENE	ENE	
	E	SE	ESE	
	NW	SE	E	
	NNE	E	E	

July 1960

SE	SE	ESE	ESE
NNE	ENE	E	E
NE	ENE	ENE	NE

ENE	ENE	ESE	SE
ENE	N	E	SSW
ENE	NE	ENE	NW

SE	ESE	ESE	Calma
ENE	ESE	E	SW
NE	N	ENE	WNW

SE	SE	ENE	S
ESE	S	NE	SSW
ENE	NNW	NE	W

ESE	SSE	ENE	S
E	SW	ENE	SW
NE	NW	NE	rec.del SW

E	SE	ENE	SSE
E	SSE	ENE	SE
NE	ENE	ENE	ENE

E	ENE	E	SE
NE	ENE	Calma	SE
NNE	ESE	NE	ESE

E	E	E
E	ENE	E
ENE	ENE	ENE

Aug. 1960

SE	SE	ENE	SSE
ESE	Calma	S	ESE
ENE	NE	S	NE

ENE	E	S	SE
ENE	E	SW	ESE
ENE	ENE	N	NE

E	E	SE	ESE
ENE	SE	SE	ESE
NE	NNE	E	NE

ENE	E	ESE	E
ENE	ESE	E	E
NE	ENE	SE	ENE

ESE	ESE	ESE	E
ESE	E	ESE	ENE
NE	E	E	ENE

		ESE	
E	ENE	E	ENE
ENE	ENE	ENE	ENE
ESE	ENE		NNE

SE	ENE	ESE	ESE
SE	ENE	ESE	ESE
NE	NE	NE	NE

ESE	ENE	SE
ENE	ENE	SE
ENE	ENE	NE

Sept. 1960	SE	SSE	NE	Calma
	SE	SSE	NNE	WSW
	ENE	NW	NNE	NW
	ESE	Calma	NE	Calma
	E	WNW	NE	SSW
	ENE	WNW	NE	NW
	ENE	SW	ESE	NW
	NNE	NW	ESE	SW
	NE	WNW	NNE	WNW
	Calma	SSE	SE	NW
	NNW	SSW	SSE	WSW
	N	SW	NNE	WNW
	S	SSE	ENE	rec. fuerte del SW
	SW	rec. fuerte d. SE	N	W
	NNW	SSE	NNE	NW
	SE	rec. muy fuerte SSW	N	NNW
	SE	SSW	NNW	NNE
	ENE	SW	NNW	N
	SE	rec. del W.	E	
	SE	SW	NNE	
	NE	rec. del SW	N	
	SE	E	S	
	S	E	SW	
	NNE	NNE	WNW	

Oct. 1960	NW	SE	NE	ENE
	E (weak)	ESE	NE	NE
	ENE	ENE	NE	NE
	ESE	rec. muy fuerte d. SE	E	NNE
	E	ENE	ESE	NNE
	NE	NNE	E	NNE
	ENE	ENE	ESE	NE
	ENE	ENE	E	NE
	NE	NE	NE	NNE
	ENE	ESE	E	NNE
	NE	ESE	ENE	NNE
	NE	NE	N	NE
	E	ESE	ENE	E
	NE	ESE	NNE	E
	ENE	ENE	NNE	ENE
	SSE	SE	NNE	ESE
	SSW	ESE	NNE	SE
	WSW	NE	NNE	NNW
	NW	SE	ENE	NE
	W	E	NE	N
	N	NE	NE	NW
	ENE	NE	NE	
	SE	NNE	NE	
	NNE	NNE	NE	

Nov. 1960	NW	ESE	NE	NE
	NW	E	NE	NNE
	WNW	ENE	NE	NNE
	NW	NE	SE	NNE
	NW	NNE	SSE	NNE
	NNW	NNE	NW	NE
	NNE	N	ENE	ENE
	NNE	NNE	ENE	E
	NNE	NE	NNE	ENE
	ENE	NNE	ENE	E
	ENE	NE	ENE	E
	ENE	NE	NE	NE
	NNE	E	ENE	E
	ENE	ENE	E	N
	NNE	ENE	NE	rec. fuerte del N
	N	ENE	ENE	rec. muy fuerte del N
	NNW	ENE	ENE	N
	NNW	ENE	ENE	NNW
	N	NE	ENE	
	N	NE	NE	
	NE	NE	NNE	
	ENE	NE	NNE	
	ENE	NE	NE	
	ENE	NNE	NNE	

Dec. 1960	N	E	NNW	NE
	NW	E	NW	NE
	N	ENE	NNW	NE
	N	E	NE	NE
	NNE	ESE	E	NE
	NE	E	ENE	NE
	NE	SSE	NE	NE
	NE	SSW	ENE	NE
	rec. fuerte d. NE	WNW	ENE	NE
	E	N	E	~~ENE~~ ENE
	E	N	E	NE
	rec. muy fuerte de E	N	ENE	NE
	E	N	WNW	ENE
	E	NE	rec. del NW	E
	rec. m. fuerte d. E	NE	N	~~NE~~ NE
	E	E	N	E
	E	E	NE	E
	rec. m. fuerte d. E	E	NE	NE
	E	S	NE	SE
	E	NW	ENE	S
	ENE	rec. muy fuerte d. NW	ENE	WNW
	ESE	NW	NE	
	E	NW	NE	
	NE	N	NE	

Jan. 1961	N	rec. del NW	N	ESE
	N	NW	N	E
	NNE	rec. m. fuerte d. NE	N	NE
	NE	NNE	NNE	SE
	N	NNE	NE	SE
	NNE	NNE	ENE	rec. de W
	NE	NE	ESE	N
	NE	NNE	WSW	NNE
	NE	N	WNW	NE
	rec. fuerte d. NE	NW	N	ESE
	NE	WNW	N	ESE
	NE	WNW	N	Calm
	ENE	WNW	NNW	N
	ENE	rec. fuerte d. W	NNW	NNW
	NE	rec. fuerte d. W	N	N
	ENE	NW	NE	N
	ENE	NW	NE	N
	ENE	NW	NE	NNE
	E	NW	E	NNE
	E	NW	ENE	NE
	ENE	NW	ENE	NE
	SE	N	E	
	SE	N	E	
	rec. muy fuerte d. N	N	ENE	

Feb. 1961	ENE	NE	ESE	NNE
	E	NE	ESE	NE
	NE	NNE	E	NE
	ESE	N	ESE	E
	ESE	NNE	ESE	E
	NE	NW	E	E
	rec. fuerte d. NW.	NE	E	E
	NW	ENE	E	E
	N	NE	E	ENE
	NE	E	ESE	
	NE	ENE	E	
	NE	NE	ENE	
	SE	NE	ESE	
ENE	SE	NE	SE	
E	NNE	ENE	N	
ENE				
	SW	ENE	SE	
	rec. fuerte d. NW	ENE	ESE	
	rec. fuerte d NW	ENE	NE	
	NNW	ENE	ESE	
	NNW	ENE	ESE	
	N	ENE	ENE	
	N	ESE	rec. muy fuerte d. NW	
	NNE	ESE	N	
	NNE	ENE	N	

Mar. 1961	SE	N	SE	E
	ENE	N	ESE	E
	NE	N	N	ENE
	NE	N	SE	E
	ENE	NE	ESE	E
	NE	ENE	NE	ENE
	E	E	ESE	SE
	ESE	E	E	E
	ENE	ENE	ENE	E
	ESE	ESE	ESE	ESE
	E	E	ESE	ESE
	E	ENE	N	ENE
	E	ESE	ESE	ESE
	E	ESE	NNE	ESE
	ENE	N	N	ENE
	ESE	ESE	ENE	ESE
	E	SE	E	ESE
	ENE	N	NNE	ENE
	ESE	ESE	E	SSE
	E	ESE	ENE	SSW
	ENE	ENE	N	NW
	ESE	SE	E	
	SE	SE	E	
	NW	ENE	NE	

Apr. 1961	NW	rec. many fuels d. SE	ENE	SE
	NW	SSE	ENE	ESE
	NNW	N	ENE	NE
				ESE
	N	N	E	E
	NNE	NE	ENE ENE E	ENE
	NNE	NNE	ENE NE	
	Calm	SE	E	E ~~SE~~
	NE	ESE	E	E
	N	ENE	ENE	NE
	Calm	SSE	E	~~SE~~
	N	WNW	E	~~ESE~~
	NNE	N	NE	~~NE~~
	ESE	N	ESE	~~ESE~~
	E	NNE	E	~~E~~
	E	E	ENE	~~NE~~
	SE	ESE	ESE	~~E~~
	SSE	ESE	E	~~E~~
	NW	ENE	ENE	~~NE~~
	NNW	rec. many fronts d. SE	ESE	E
	NNW	SE	E	ENE
	N	N	ENE	ENE
	NNE	N	ESE	
	ESE	N	E	
	ENE	N	NE	
		NNE		
		NE		
		NE		

May 1961	SE	SE	E	SE
	ESE	~~SE~~NW	ENE	ENE
	E	W	ENE	NE
	E	NNW	E	SE
	E	NNW	NE	SE (debil)
	NE	NNW	NE	NW
	E	WNW	ENE	NW
	E	WNW	NE	NW
	NE	WNW	NE	NW
	E	E	E	Calm
	E	E	ENE	NE
	E	ENE	NE	NE
	E	ESE	ESE	E
	E	E	E	E
	E(poco)	ENE	NE	NE
	E	E	ESE	E
	E	E	—	ENE
	E	ENE	—	NE
	E	ESE	ESE	E
	E	E	E	ENE
	ENE	NE	ENE	NE
	ESE	~~E~~E	E	
	E	ENE	E	
	E	NE	NE	

June 1961	ENE	ESE	E	ESE	
	ENE	E	E	Calm	
	NE	NE	NE	NE	
	E	ESE	E	SE	
	ENE	E	E	ESE	
	NE	ENE	E	NE	
	E	ESE	ESE	ESE	
	E	E	ESE	E	
	NE	ENE	ESE	NE	
	E	E	SE	ESE	
	E	E	SE	E	
	E	E (rachas hasta 100 km.)	SE	NE	
	E	E aumentando	S	E	
	ENE	E	Calm	ENE	
	NE	E con rachas fuertes	"	NNE	
				July 1961	
	E	ENE	SE	ENE	
	E	ENE	SE	ENE	
	E	ENE	N	— E NE NE	
	E	E	SE	ESE	
	ENE	ENE	E	calma	
	NE	ENE	NE	NNE	
	ESE	E	ESE	E	
	ESE	ENE	ESE	ENE	
	NE	ENE	NNE	NE	
					ENE
				E	ENE
				E	NE
				ENE	

from 11.22

4 41883 Terminalia catappa L.

1

1 84 Mentha spicata L.?

1 85 Portulaca grandiflora Hook.

1 86 (Commel.) Setcreasea purpurea Boom

1 87 Chenopodium ambrosioides L.

1 88 Capsicum annuum L.?

1 89 Capsicum annuum L.? 2

on narrow sand
flat behind seaward beach

5 90 Tournefortia gnaphalodes R. Br.
common

near lighthouse building

1 91 Crinum sp
planted

2 92 Opuntia dillenii (Ker-gawler) Haworth
locally abundant,
forming dense patches

on lagoon beach ridge just
inside edge of Suriana
scrub, near south end.

2 93 Conocarpus erectus L.
one plant, only,

To p. 86

shrub 1.4 m. tall, leaves
all small

"yerba buena"

ornamental, flowers magenta

diffuse, stems brittle,
leaves dark purple esp.
beneath, flowers magenta,
closed in afternoon.

— used as worm medicine,
very rank odor.

— sweet bell pepper.

a strong pepper with
small spherical fruit.

low rounded bushes,
6 dm tall, 1.5 m. wide.

sterile

plants 0.5-1 m. tall, much
branched, ~~[illegible]~~ areoles
tending to be on mamillae;
flowers pale yellow, fruit
dark red, juicy, pleasant
to taste.

old gnarled bush about
1 m. tall, spreading, single
trunk.

July 3 - Perez I.

Reef flat seaward of islet - about 1.5 m depth - bottom sandy with clumps of algae on dead coral blocks, with a number of kinds - Dictyota, a Gigartina like red, Halimeda, and a large sea anemone with fish living among its tentacles.

Some areas have little or no algae.

Strombus gigas very common. a.

Some areas have dense meadows of Thalassia, with many small fish, crabs, sponges, sea anemones, etc. On the blades of the Thalassia a small coelenterate resembling tufts of thick filamentous algae of a pale brownish color, which stings rather painfully.

Areas between Thalassia beds seem scooped out by waves.

July 4 - Chica I.

A flat platform of sand covered on the west end by a sparse growth of Euphorbia right to the top of the beach - cover on margins 75% more inland much sparser. Scattered Cakile both living and dead near margins. The Euphorbia mostly in rather dried up condition but occasional plants bright green. Much of it actually dead, dead plants side by side with living ones. A few patches of Sporobolus virginicus mostly dead, but a few tips living, one small area green.

A few large mats of Portulaca oleracea, up to 36 cm. across, fls. (closing at 8:30 a.m.) 1-1.5 cm. across petals emarginate to apiculate stamens 23-34. stigmas 5.

Vegetation inland much sparser, also mostly dead, locally, but scattered Euphorbia bright green.

Thalasseus on small
sand horn (orange bills.)
perhaps 20-25.
~~[illegible]~~ 20-30 black headed gulls.
6-8 blue faced boobies
with young. These downy
to partly feathered out
and almost full grown.
One parent stayed with
each young. Two of these parents
got in a mild fight, locking
beaks and tugging. Not much
alarmed until approached
within 10'. One has 2 eggs, will not leave.
One low Suriana bush
0.7 m. tall, 4 m. across
at top of beach on side
toward Pajaros near middle.

On n.w. side between
2 short horns a low sand
ridge perhaps 0.5 m. above
general level. Outer slope
steep. Covered to top on
inner side with open
dwarf scrub of Euphorbia-
most of it rather dried
up, some dead.

2 boobies with newly
hatched young, scarcely
even downy yet.

Central part of island
mostly covered by sparse
Euphorbia dwarf scrub
in parts almost dead.
a few plants of Portulaca
locally.
Sandy patch or low
dune at base of ~~east~~
north sand horn,
a few wisps of Sporobolus.
5 ruddy turnstones.
Loose white sand.
Euphorbia back of it
green at margins of dune,
drier back farther.
Several patches of green
Sporobolus scattered
across east 4th of islet
but back 30 m. or so from
end. Patches near and
on low beach ridge on
n.e. side more dry.
some dead. Here ~~four~~ six
small Suriana bushes
0.4 m. high up to 1.5 m. across,
mostly smaller.
Euphorbia on loose
broad sand ridge on
east end open, rather green.
Some wind erosion here.
Back part held by
Sporobolus.
Just back of this a
patch of Sesuvium

17 x 20 paces across.
A few small Suriana bushes scattered on this end.
Inland from this an almost bare area of red-brown loose coarse sandy soil, much burrowed by crabs.
Most of sparse stand of Euphorbia dead.
A few Portulaca – long ascending diffuse form.
Toward s.e. corner large patches of almost closed green Sporobolus.

A small nest with an egg – dull gray with blackish brown irregular spots, (about like Gygis) Nest about 15–18 cm. across of Euphorbia twigs. Gulls flying around making much noise.

2 smaller patches of Sesuvium on s.e. corner of islet surrounded by large patches of Sporobolus on landward side.
Several small Sesuvium mats on east beach.
Also Euphorbia, mostly

small plants, scarcely more than seedlings, but fruiting; some dead Cakile.
One or two very small Suriana around this corner on beach. One tiny plant of Tournefortia.
Small patch of low Suriana just outside second largest Sesuvium patch, near top of beach.
Some small piles of guano in this and some fairly large dead stems.

all photos before
Avicennia are chica 9.

July 4 Pajaros Islet

On south end is a long narrow spit of finger-like coral fragments, 400 paces long, bulbous at end, enclosing 2 small ponds. These lined with Avicennia mostly 1, up to 2 m. tall, dense, spattered with guano. The leaves also eaten by insects.

Scattered mats of Sesuvium mostly small, on gravel ridge around the Avicennia.

The end of the spit is eroding away, leaving some of Avicennia with roots exposed.

Sesuvium is obviously first colonist on gravel. Varies in color from yellow to green. Many seedling mats.

Many seedling Avicennia in low spots.

Sesuvium mats are only vegetation on terminal 150 m of gravel, except Avicennia. Then dead Cakile, on sandier facies, with fewer Sesuvium mats.

50 m. farther on a single bush of Tournefortia on sand. then small Euphorbia fairly common, less Cakile. and Portulaca locally on sand. Occ. Tournefortia.

Piles of Strombus shells.

Euphorbia mostly rather dried, some dead

60 m. on a large mat of Sesuvium. Much Cakile — gravel here again. Less Euphorbia. 20 m.

Then a sandy stretch with Euphorbia and Cakile 20 m. Then another large mat of Sesuvium. 24 m. Then a small patch, 3 × 4 m. of Sesuvium, about .7 - .8 m, tall.

Then a 50 m. stretch of sand with patches of Sporobolus one of Sesuvium, scattered Portulaca fairly common Cakile and Euphorbia.

Portulaca with fls. 1 cm. ± 20-27 st.

one Cakile green, in fruit, one flowering, rest dead.

Then main body of islet, continuous cover of Sporobolus, except in depression behind west

beach ridge, which has several diagonal low riddges of finger coral gravel. Here is sparse ~~dead~~ Cakile mats of Sesuvium, Euphorbia, Portulaca, 1 live Cakile. Euphorbia green to dead. 1 gull 1 willet [illegible] along lagoon beach.
Tribulus mats on sand.
Some small Sesuvium mats in Sporobolus lawn.

Solid Sporobolus extend perhaps half way to end Then a large patchwork of mats of Sesuvium, patches of Sporobolus and an open stand of Portulaca on mixed sand + gravel. Some Tribulus mats. (photos) Cakile toward west side mostly dead, 1 living.

Perhaps 100 or more blue faced boobies in this area. mostly with young in various stages from just hatched to almost grown.

Very low sand ridge on w. side with almost pure open stand of dead Cakile and abundant

seedlings of it on seaward slope of beach ridge above beach. A very little Portulaca and Euphorbia here.
Some Cakile in flower (white) especially northward on ~~[illegible]~~ back slope of ridge.
More Euphorbia where ridge tends to become double. A patch of Tournefortia about 4 m. across, low.
Also a low bush of Suriana
Then a patch of ~~[illegible]~~ Cenchrus about 10 m. long, completely dead. A small patch of Cyperus
Much Euphorbia.
Inside this 5-10 m. strip is an almost continuous belt of Sporobolus extending around the north end of the islet, approaching beach part way around.
Great pile of Strombus gigas shells, animals used for bait by commercial fishermen, line beach.
(photos)
Some interruption of Sporobolus by large

Sesuvium mats.
Some Portulaca and Euphorbia at top of north beach.
Inside the Sporobolus along the north side is a strip of open to sparse Euphorbia dwarf scrub. (Photos) Euphorbia mostly green except a few old dead plants! On very slightly higher ground this is mostly dead, mixed with Portulaca.

attach with p. 19 X

2 boobies seen with eggs, one with 1, one with 2.

A number of turtle holes in west sand ridge near n. end. n. of Tournefortia.

Guano piles esp. where there are bushes, cf. Tournefortia

Under Sporobolus
Lepisma + isopod (?) + cricket
Under Sesuvium
pupillid + tornatellinid
On Avicennia
flies, coccinellids

Two mss. shown me by ~~F. Bonnet~~ F. Bonet

Bonet, F. + Rzedowski, J.
Vegetacion de las Islas del Arrecife Alacranes, Yucatan (Mexico).
with maps.

Huerta Musquiz, L.
Flora marina de los alrededores de Isla Perez, Arrecife Alacranes, Sonda de Campeche, Mexico.

~~alg~~ Description of algal communities but not a flora.
Was in Alacran in July, 1960. + perhaps also in May, 1955.

Bonet's paper based on 3 expeditions, 1955, 1959, 1960.

Bonet uses term "restinga" for sand bars (+ spit?)

To be published ~~by~~
Escuela Nacional de Ciencias Biologicas, I.P.N.

Dr. Bonet found a small lizard, Emoia cyanura vel aff. Hoskin says he has seen these for 3 years but has not managed to collect any. I collected one at n. end of Perez ?.
Mabuya mabuya
det. D. Cochran; Walter Brown.

List of species

		Earlier ✓	Perez M	Perez B	Perez F	Desertora M	Desertora B	Desertora F	Pajaros M	Pajaros B	Pajaros F	Chica M	Chica B	Chica F	W Dert. F	E Dert. F
14	Suriana maritima		X	X	X	~~X~~	~~X~~	1	1	1	X	1	X	X		
12	Sesuvium portulacastrum	✓	X	X	X	X	X	X	X	X	X	X	X	X		
7	Sporobolus virginicus	✓	X	X		X		X	X	X	X	X	X	X		
18	Conocarpus erecta	X	X	[illegible]	1				[illegible]							
15	Tribulus cistoides (T. alacranensis)		1			X	X	X	1	X	X	X			1	
16	Cakile ~~edentula~~ lanceolata var. alacranensis (C. alacranensis)		X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	Cenchrus pauciflorus		X				X	X		X					X	X
6	Cenchrus ~~incertus~~ pilosus			X			X	X	X	X	X				X	
4	Cenchrus gracillimus							X								
13	Portulaca oleracea		X	X	X		X	X	X	X	X		X	X	X	X
17	Euphorbia ~~buxifolia~~ mesembrianthemifolia		X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	Atriplex pentandra (A. cristata)		X	X	X		X	X	X	X		X	X			
19	Opuntia dillenii (O. tuna)		X	X	X			X								
20	Tournefortia gnaphalodes		X	X	X			X	1	1	X			1	X	X
8	Cyperus ~~planifolius~~ ligularis (C. brunneus)		1	X	X						X					
26	*Coccoloba uvifera			X	X											

	Perez				Desertora			Pajaros			Chivea	
	M	B	F		M	B	F	M	B	F		
18 *Cordia sebastena		X	X									
21 Avicennia germinans ~~nitida~~		X	X						X	X		
20 Flaveria linearis	X	~~X~~										
11 Philoxerus vermicularis	X				X							
9 Boerhavia repens	X											
20 Scaevola plumieri ~~lobelia~~ (S. lobelia)	1											
31 *Nopalea cochinellifera		1	X									
15 *Casuarina equisetifolia		X	X									
24 *Crinum sp.			X									
30 *Terminalia catappa (pot)			1									
34 *Capsicum annuum 1 (pot)			1									
35 *Capsicum annuum 2 (pot)			1									
29 *Jatropha urens ~~sp.~~ (pot)			1									
33 *Mentha spicata ? (pot)			1									
27 *Chenopodium ambrosioides (pot)			x									
28 *Portulaca grandiflora (pot)			1									
36 *Solanum lycopersicon (pot)			X									
		#u		[illegible]								
3 Thalassia testudinarum		x	X	x								
1 Syringodium filiforme ~~Cymodocea manatorum~~		X	x	X								
2 Diplanthera wrightii		X	X	X								
37 Sesamum indicum			X									

1961 Mexico - Yucatan

July 4 — Pajaros Islet,
Alacran Reef
on ~~san~~ coral sand
and fine gravel

41894 Cenchrus ~~[illegible]~~ pilosus HBK
5 one patch a few m. across

2 95 Cyperus planifolius L. C. Rich
small colony

5 96 Tribulus cistoides L.
~~[illegible]~~ fairly common

5 97 Tournefortia gnaphalodes
large plant, several m. across
and several smaller ones

4 98 Suriana maritima L.
rare

5 99 Euphorbia buxifolia Lam.
very common

41900 Cakile edentula v. alacranensis (Millsp.) Schulz
5 abundant

5 01 Sporobolus virginicus (L.) R.Br.
abundant, dominant
over large areas.

5 02 Portulaca oleracea L.
common

5 03 Sesuvium portulacastrum L.
very common, locally abundant

2 04 Avicennia ~~nitida~~ germinans (L.) Stearn
locally abundant, around
small ponds.

Alacran

large clumps, but
completely dead at
— this season.
spreading tufts.

prostrate, forming
— loose mats, petals yellow.
erect branches
from subterranean
— stems.
low bush; flowers yellow.

stems ascending

sprawling much branched
— herb; flowers white.
forming a loose sod;
sterile.

stems prostrate, radiating
from central root crown;
flowers about 1 cm. diam., yellow.
— stamens 20-27; style branches 5.
prostrate, forming
large mats; leaves
fleshy, compressed,
scarcely glossy; flowers
— pink. Stems brownish-reddish gray.
shrub 1 m. tall; corolla
white, tube yellow; infl. black.

1961 Mexico - Yucatan

July 4 - Chica Islet.
on coral sand soil

4 1905 Sporobolus virginicus (L.) R. Br.
2 locally dominant
2 06 Suriana maritima L.
occasional locally
1 07 Tournefortia gnaphalodes R.Br.
rare, one tiny plant seen
2 08 Sesuvium ~~maritimum~~ portulacastrum L.
locally common

5 09 Portulaca oleracea L.
very local in open area
2 10 Cakile edentula var. alacranensis (Millsp.) Schulz
very common
5 11 Euphorbia buxifolia Lam.
abundant, dominant
plant on most of islet
5 12 Portulaca oleracea L.
common

July 5 - Perez I.
in 1.5 m. water at north end
5 13 Syringodium filiforme Kütz.
common locally

to p.102

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alacran

forming loose sod; sterile.

small bush, 0.6 m. tall.
leaves somewhat fleshy.

forming large mats;
stems prostrate, slightly
reddish; leaves
fleshy, somewhat compressed,
not glossy.
— stems many, bright
— red, diffusely ascending.
mostly dead, this plant
— alive.
stems ascending,
plant glaucous green.

stems prostrate, red,
plant fleshy; flowers
yellow 1-1.5 cm. across.
~~number of st~~ petals
emarginate to apiculate;
stamens 23-37, style branches 3.

rhizome white; leaves
terete; sterile.

July 5 - trip by boat to Desterrada Cay.

Sooty terns flying over lagoon include immatures that have varying amounts of gray on under sides.

North of Perez I. are some areas of shallow water with Thalassia, a stretch of deep water, then a vast area of reef of 1-3 m (?) depth. This is largely sandy, with irregularly scattered brain corals and patches of brain corals, with sea fans, Gorgonia, algae, etc.

Approaching Desertora Cay the water gets deeper still with dark patches, apparently of brain corals and associated forms. Then a more uniform deeper bottom, finally too deep for observation. The islet has a rather high sand ridge on the lagoon side, with a steep beach. A large patch of Opuntia, and some areas of low shrubby types, possibly low Surianas. Much open sand and

grass. Large colony of frigate birds, mostly sitting on ground, some on a series of pilings, just off shore. An enormous number of blue-faced boobies.

Six brown boobies flying north of Desertora. Great expanse of rather deep water here.

Then an area of rather deep, finely patchy reef, too deep to tell its character. Another deep area. Then more deep patchy reef.

To the left (west) a large patch of submerged sand — Desparacida I. — and on its northern part a line where waves are breaking — not clear if only lagoon waves or if lagoon and sea waves come together here — probably latter. Sand almost breaks surface in a narrow strip.

Two porpoises ~~here~~ north of here.

Between Desertora and Desterrada, except for patches just noted, the water is so deep that bottom cannot be seen. but a shallow area extends s. w. from Desterrada.

A number of royal terns seen, all flying towars east Desterrada.
Some vegetation on each of these, on higher sand.

Near Desterrada is a considerable area of shallow water.

Desterrada is an irregular surface of low dunes. covered principally by Tournefortia. Locally patches of Euphorbia near lagoon. Tufts of Cenchrus scattered on lagoon side. Portulaca occasional
Mounds of Guano frequent in Tournefortia. Cakile occasional mostly dead, some flowering.

Cenchrus pauciflorus and Cakile common on seaward face of dunes.
Cenchrus generally scattered everywhere in dune area.
A 15 m wide sand terrace back of top of seaward beach has only a few seedling Tournefortia. — a m. or so lower than general level of dunes.
Considerable area of dunes near w end on seaward side blown out, leaving a flat surface with debris of old Tournefortia, but almost no living plants. Level with terrace farther east.
Western 50 m. is a flat sand terrace with little or no vegitation, ending in a sand lobe pointing north. A few wisps of Cenchrus, Tournefortia and Cakile near base of lobe.

Terrace extends some distance down lagoon shore, narrowing.

Back of it locally
Euphorbia is common,
locally also Portulaca
and a few dead plants of
Cenchrus insularis, with
more abundant C. pauciflorus.
Tournefortia is general
vegetation. Some seedlings.
Along inner edge of terrace
and outer dune is
abundant Cakile.

6 great Chelone mydas
in shed on backs.

As islet narrows to east
~~seaward~~ dune ridge is
higher, seaward terrace
pinches off, lagoon
terrace appears again
with a few green Cakile
only. Patch of Euphorbia
in interior, some dead
Cenchrus pauciflorus,
otherwise Tournefortia.
Where the islet narrows
to a spit the dune ridge
fades out, and with it
the Tournefortia. Cakile, dead,
goes a little farther. Then
no more vegetation. Some
layers of Thalassia leaves
in sand on north side.
North side of spit slopes

gradually, but waves
have cut a low cliff

a flock of terns - medium
size dark grey on back
white nape + bridled terns
some with black head
and under parts except
light tail, light shoulder
patches - congregated
on spit. black terns
East Desternada -
Large sand flat on
s. w. end with no
veg.
Then a few small
scattered dunes
with Tournefortia.
some Cakile between.

• Fairly large bird,
dull gray on back
mottled, light beneath
straight bill, long
legs, teetering habit,
longitudinal white
band on wings when flying

An area of dunes
with Tournefortia,
a little Euphorbia,
much Cakile (dead) on
terrace on seaward side.

Locally Cenchrus pauciflorus, 1 plant of Portulaca.

Much dead Tournefortia where islet begins to narrow. A large blown out saline flat with a few small dunes on seaward side.

Very flat scarcely above sealevel. A thin grayish crust – algae + salt?

Back of this a few dunes Tournefortia Euphorbia, 1 portulaca.

Farther near end of islet a deep (1 m ±) saline pond with gelatinous bluegreen algae reminiscent of those on Xmas I.

Nearer tip several more tiny such ponds, one with Cladophora (?) in it.

At end a perfectly enormous flock of Royal terns, at least several thousand. sitting on ground, protesting when scared up, mostly not wanting to leave. Many have black beaks – immature? several laughing gulls with them.

~~[illegible]~~ large gray black-spotted eggs – large in slight depressions in sand, on berm at top of seaward beach.

much ado for so few eggs.

A few small dunes with few Tournefortia near end and very sparsely scattered along seaward sand beach ridge.

Much Cakile between Tournefortia here.

Piece of coral, somewhat rounded.

The two islets are connected by a great sand ~~bar~~ apron extending well into lagoon, about 1 m. of water.

apron

Not a sign of beachrock on whole area, both islets, + sandbar.

beach rock

These two islets are entirely of fine sand except for a few corals scattered here and there, and vast quantities of shells. Much Halimeda on surface.

These are mostly truly pioneer situations as truly as that of Sesuvium on the other islets.

Desertora I. -

North end almost bare, many hundreds of blue faced boobies with young in all stages, some with eggs. (photos)

Vegetation of rookery area is almost entirely mats of Tribulus.

Around this, flat tufts of Cenchrus, some Euphorbia, much Cakile. esp. along a very low north beach ridge.

South of open area fewer nests. Euphorbia is common and green, much Cenchrus insularis. Scattered Portulaca.

Several laughing gulls flying. Many frigate birds.

Some rather sick, even dead mats of Sesuvium. Frigate birds nesting here on ground. Nests are very low mounds of twigs.

Toward seaward, south of open area, Cenchrus insularis is dominant.

The dying Sesuvium is on rather high sandy ground.

The Tribulus flats continue just back of very low beach ridge almost to seaward corner, where a mixture of Euphorbia and Cenchrus replaces it, with many frigate bird nests with fully feathered out young (photos). Some dying Sesuvium mats here too. Some boobies nesting here too.

Tribulus pauciflorus here also.

Beyond this a lower terrace, ending in a lobe and extending perhaps halfway along seaward shore. Scattered seedlings of Cakile.

Some boobies on this.

South from point much Cakile (dead) on terrace.

A number of turtle holes.

Inland from this a belt of Euphorbia with some Cenchrus.

Back of this a low bare moist spot with many crab holes.

Then a broad low ridge with open Euphorbia.

Then a low bare dry spot of dark soil, dead Sesuvium on it. Broad area of this in center of islet with some Atriplex and Euphorbia.

Many dead birds, mostly young frigate birds.

Several Tournefortia along lagoon beach ridge. Patch of Opuntia near s.e. corner.

Piece of coal, somewhat rounded, above beach.

July 6 - Desertora Islet

Just north of islet 50-60 or more brown boobies in air. Not clear where they live.
2 ruddy turnstones on beach

Tribulus area has pairs of boobies spaced about 2 m and Tribulus mats with most crowns about 2-3 m. apart. mats 1-2 m across.

Along lagoon coast a very low sand ridge, with Cakile and a few Cenchrus pauciflorus and Euphorbia.
Back of this only slightly lower, a gently undulating sand flat. with, near coast, Cakile, Cenchrus pauciflorus, Euphorbia, a few Portulaca plants. One Tournefortia bush.
Inland are patches of Sesuvium, dead or partly so.
much dead Euphorbia, some live.
Farther in large dead Sesuvium areas and extensive Atriplex flats, these two occupying the central area.
A few live green Sesuvium mats.
Near s.e. corner a zone of Sporobolus just back of lagoon beach ridge.
green Sesuvium over an extensive area back of that, around the patch of cactus.
One brown booby on ground

1961 Mexico - Yucatan

July 5 - Desterrado Islet
on low dunes of fine
coral sand.

41914 Cenchrus ~~insularis~~ pilosus HBK
2 rare, ~~near~~ toward inner beach
2 15 Euphorbia buxifolia Lam.
common locally
2 16 Tribulus cistoides L.
one plant seen, near center
2 17 Portulaca oleracea L.
occasional on lagoon half
of islet

3 18 Tournefortia gnaphalodes R. Br.
the dominant plant on the islet

5 19 Cenchrus pauciflorus Benth.
common
2 20 Cakile edentula var. alacranensis (Millsp.) Schulz
common, fruiting plants
all dead.

July 5 Perez I.
1 21 Solanum lycopersicum L.
planted in a pot in an enclosure

to 106

Alacran

dead clump.

glaucous green.

prostrate, loose mat,
half dead; one yellow flower.
prostrate, fleshy, stems
bronzy; one flower seen,
yellow, petals emarginate,
stamens 22.
low spreading bush,
stems erect from
prostrate ones.
prostrate spreading
clumps.
flowers white

flowers yellow; fruiting.

Desertora I. (ctd)

Colony of about 75 frigate bird nests in cactus patch everything from eggs to fully grown young. Males with distended pouches entirely black.

Considerable damage to cactus patch.

Sporobolus does not extend around south side. On corner one small Suriana bush, one Tournefortia.

Sand lobe on corner with open stand of Euphorbia, Cakile, & Cenchrus pauciflorus.

Sesuvium flats, quite open along south end, right to top of beach.

Broad strip of open to sparse Euphorbia dwarf scrub in from beach along s.w. side. patches of Cakile and of Cenchrus insularis on & just back of sand ridge.

Lycaenid butterflies abundant around Atriplex in interior.

Northward just behind beach ridge on w-side

extensive dead patches of Sesuvium — almost completely dead, rather few frigate nests.

A number of laughing gulls flying.

Reddish-yellowish brown soil (sample) from upper layers in depression with dead Sesuvium. Many crab holes. Coral fragments rotten & brown.

In general Cakile is in an outer zone, mostly on beach ridges and upper slopes of beaches. Tribulus in areas of greatest concentration of booby nests. Portulaca rare but general in sparse areas of other vegetation. Tournefortia and Suriana only just back of beaches.

Atriplex only in central part.

Sesuvium general, but healthy only in extreme south end. Sporobolus only back of a lagoon beach.

1961 Mexico – Yucatan

~~N.N.W. of Perez 3 or 4 [illegible]~~
~~[illegible]~~
July 6 – Desertora (Allison) Islet
Alacran Reef
on sand flat, ± 1 m.

41922 Portulaca oleracea L.
2 occasional generally
3 23 Tribulus cistoides L.
abundant in open areas
3 24 Atriplex pentandra (Jacq.) Standl.
abundant near center of islet
2 25 Sesuvium portulacastrum L.
abundant on ~~[illegible]~~ south end of islet.
2 26 Sporobolus virginicus L.
one large patch on s. e. corner
2 27 Tournefortia gnaphalodes ~~[illegible]~~ R.Br.
two plants only seen, just
back of lagoon beach.
2 28 Suriana maritima L.
one plant seen, on ~~[illegible]~~
lagoon beach ridge, south end.
2 29 Cenchrus ~~pauciflorus~~ gracillimus Nash
fairly common along
lagoon beach ridge
and somewhat inland.
5 30 Cenchrus ~~insularis~~ pilosus HBK
generally common, locally dominant.
3 31 Euphorbia buxifolia Lam.
generally common, locally dominant
2 32 Cakile edentula var. alacranensis
abundant on beach ridges and upper beaches.
July 6 – Perez I.
1 33 (blue green alga)
forming crust in area of sand how wet by salt water

prostrate; flowers yellow.

prostrate, forming mat
2 m across; flowers yellow
(type locality of T. alacranensis Millsp.)
much branched rounded
low bushy gray plants.
forming extensive mats;
leaves fleshy, compressed, dull,
forming a low closed
sward; sterile.
low spreading rounded
shrub, branches erect.

shrub 0.7 m. tall.

spreading dense
prostrate clumps.

spreading dense
prostrate clumps.
dwarf shrub; leaves
glaucous; much branched at base.
leaves fleshy. Plants mostly
dead skeletons.

Percy I. – drilling, up to July 6, afternoon 27', through sand with some layers of coral in sand.

July 7 – left at 9:15 a.m. slightly fresh breeze from east, about half cloudy sky – cumulus.

2 porpoises a few miles out.

1961 Mexico – Yucatan

July 7 – Merida – Chichen Itza by car. ~~Stop~~ Odometer near center of town 246 mi.

Windmills a characteristic feature in Merida.

Trees – Cedrela, Cocos, Cassia, Roystonea, Samanea, Enterolobium, Melia, Eriobotrya, Terminalia, Casuarina, Delonix.

250 (odometer readings in km.) Edge of town (r.r.)

Patch of henequen just outside city, more large fields of it.

Tricholaena along road.

Large patches of low secondary scrub, mostly leguminous.

Henequen yields about 14 years before replanting. Rows perhaps 3 m. apart, plants 1 m.± in rows, blue-gray in color. Low green herbaceous ground cover bet. rows.

257.5 Hda. Teya. Henequen more continuous beyond here.

260 Some fields very weedy, with shrubs. Then an irregular tangled scrub forest about 5-6 m. high, alternating in large areas with Henequen. The scrub forest varies

in density, and some of it is certainly regrowth in abandoned henequen fields. It is green at this season, but must be deciduous in dry periods. Varies to a scrub status.

In newly planted henequen fields are piles of slabs of limestone, marking 20 m. intervals in square arrangement.

In older fields the trunks may reach 1.5 m. ~~[illegible]~~ or even 2 m. but then some of them flower.

Scrub forest does not appear especially spiny but where opened up by grazing there may be Opuntia. Also Ipomoea fistulosa.

Old henequen fields are after flowering grown up to brush and are then burned.

274 To here the greater part of the land is in Henequen. From here about 2.5 miles of scrub forest, then more henequen.

The most developed of the scrub forest has a continuous rather dense canopy, undergrowth somewhat open.

279 ~~Hu~~. Holcatun - center of large henequen area.

Stone walls common around and between fields. Some strips of scrub forest along road, hiding fields.

282 Country a little rougher, low karst with rock exposed. Croton sp. common in undergrowth and on roadsides. Some patches of forest. mostly Henequen.

286. Tahmek. Black vultures common.

Henequen fields on rolling ground with much scab-rock showing. Relief 5 m or mostly less.

After burning over a field of henequen after it has flowered, a crop of maize is planted. After harvesting this, the stalks are burned. Then henequen is replanted.

291.5 Hoctun.

After this ~~[illegible]~~ little more henequen.

scrub forest along road.

A few fields of henequen.

295 ~~Poblado [illegible]~~

A slender tall fan palm with long finely branched panicles common here.

Beyond here much dense tangled scrub 2-4 m. tall. locally 5-6 m. Mixture of microphyllous legumes and larger leafed shrubs & trees, not very spiny. Occasional small rocky clearings, scarcely any soil.

The scrub is very dense here, green at this season.

Dry season from December to May. Scrub is deciduous leafless during that period.

Some vines generally, many locally. Some Jatropha (Cnidoscolus).

310 Kantunil.

Scrub and scrub forest with clearings on low karst, only pockets of soil, but this a dark chestnut brown. Some grazing.

315 A small henequen field.

Horses and cows wandering along roads.

Generally along this highway there is a strip on each side about 20 m. w. that is kept clear, with sprouts and shrubs not more than 1 m. high. But this and field or ~~f~~ scrub may be a barbed wire fence, or stone wall, or nothing.

318-19 Considerable clearing.

320 Some maize fields. Scrub forest.

322 ~~Holt~~ Holcha. Some bananas around town. A small apiary.

Then more or less continuous scrub and scrub forest.

A very few clearings.

The trunks in the scrub forest vary from 1 to 5 rarely 10 cm. thick. The spacing of smaller ones 2 - 4 dm. larger ones (5 cm +) 1 - 1.5 m.

Still the same low rounded karst but

331 here perhaps the relief is up to 10 m. locally. with sink holes deeper than that.

A fan palm (Sabal?) very rarely seen in scrub forest.

Some charcoal burning in scrub forest.

334.6 Libre Union

Some palm thatched huts.

337 Relief becomes a bit more pronounced.

A fan palm and several arecoid palms in a sink hole. An occasional Cecropia. Dense low forest, but locally much opened up by charcoal burning

338-9 Scattered houses - palm thatch

(km 99) Cattle along road.

Scattered taller trees ~~sta~~ as emergents in forest. Some tall fan palms.

342 Yokdzonot

Forest seems more luxuriant here, locally very scrubby, many clearings with maize. Various stages of regrowth. ~~Sm~~ Still microphyllous but perhaps more larger leafed trees

Tendency for forest to be lower and more scrubby on tops of knolls, taller in depressions, making a canopy that is much smoother than the actual terrain.

1961 Mexico - Yucatan

351 a few scattered ranchos.
Forest becomes somewhat less microphyllous, at least locally.

356.5 Piste

Forest somewhat lower, but quite dense.

359 Chichén Itzá.
Sun quite hot, slight breeze.
In all directions, from the tall pyramid, one sees the same irregular scrub forest, in places with emergents, in places these close enough to make a good open to closed taller forest. Mostly microphyllous scrub forest. Some scattered Cecropia.
Leucaena leucocephala reaching 10 m. and a number of other legume trees are principal components of both scrub forests 8 m and forest 8-15 m.
Lianas very common.
A few bromeliads in trees but only in a very few trees.
A few spiny plants - Randia.
The flora appears quite diverse and rich.

The great pyramid is restored on two sides, crumbling on other two.
The Cenote is a great round hole in the bedded limestone, with vertical walls, sharply undercut at water level. Many plants on walls. (photos)

Scrub between Cenote and pyramid, along the raised road, about 4-5 m. high, dense, tangled with lianas, canopy almost complete but thin. Vines are Bignoniaceae, Menispermaceae, Cardiospermum, legumes, Dioscorea
A very few small Cereus.
Very little ground cover except a sub-shrubby Croton and a Scleria, a few vines, a small grass.

The most abundant shrub is a mimosaceous one with panicles of short pedunculate spikes of whitish flowers with very short stamens. Pods very broad and thin, finely veined.

On way back —
stop near highest
point in road —
about 6 km. from C.I.
where road is cut
through a knoll on
the karst. — the limestone
varies from hard to
chalky, bedded, dipping
slightly.
Covered with scrub
forest 5 m. tall ± mainly
legumes, allophyllus,
Croton etc many
liana's. So dense
that walking
is slightly impeded
especially by vines.
No ground cover
In lower spots adjacent
the forest reaches 8 m.

Roadsides cleared to about
km 101.

About km 99 — photos
of scrub forest + charcoal
kiln being loaded.
Dense scrub forest
about 6-10 m. largest
trees are Bursera about
20 cm dbh. spaced about
5 m. Some 4-5 cm. trees.
But mostly slender

wand like trees
of a number of sorts
from 0.5 to 1 m. apart
Some shrubs, — 2 m.
Almost no ground
cover. Layer of
litter. Black or dark
brown, highly humic soil
mixed with pebbles +
cobbles, 15 - 20 cm. deep.
in some spots almost
none, on rough rock layer.
Limestone here bedded
(photo) beds 20-30 cm. thick
alternately hard and
soft and earthy. The
soft ones mottled with
iron oxide.

Photo of charcoal burning
near Libre Union.

Sky mostly overcast by
heavy cumulus and
thunder showers on all sides.
Said to rain most afternoons.

At about km. 75 are a
number of small Maya
mounds, completely covered
by scrub forest, right in road.
Tohmek —
About 40 km out of
Merida — photos of henequen.

Here they do not distinguish between sisal and henequen so far as the plants are concerned. Sisal is the fiber, henequen the plant. It is a very glaucous, narrow leafed agave, not exactly the greenish plant widespread in the Pacific. Narrower leaves, smaller panicle. Requires practically no soil, gets along with no water but condensation in dry season.

Merida –

Merida – C.I. about a 2 hour trip, driving moderately

trees – Plumeria rubra, Citrus spp. Samanea, Persea, Palaquium, Mammea, Phoenix sp.,

July 8 – Chichén Itzá,
in rock crevices in the Great Pyramid

1 41934 Spermacoce
common

1 35 Spermacoce

plant ~~[illegible]~~ somewhat purplish; flowers white.

flowers white; plant erect.

July 22 - Wildcat Mt.
beyond Bethel from Warrenton
± 1138 acres, wooded except for a few very small clearings. A strip of forest between property and farms at foot of hills. Property mostly on west slope. The strip belongs to Arundel. The farms west are mostly cattle meadows in active use.
Forest on air photo shows a mosaic of textures.

Below here - ~~oak~~ hickory second gr. scattered Pinus virginiana but this only near top.
Trees up to 20 cm, a few wolf trees - Liriodendron - to 60 cm Quercus rubra,

Rich herb layer
Galium.
Adiantum
c. Arisaema atrorubens
a Smilacina
a Parthenocissus
Circaea
- Camp-ame.

Cornus florida
Viburnum ac.
Cercis
Lindera (wet spots)

Ulmus
Fraxinus amer.
Diospyros
Castanea (dead)
Quercus prinus
Carya
Quercus rubra

Chimaphila mac.
Vaccinium vac.
Solidago caesia
Galium triflorum
Cimicifuga
Monotropa
Impatiens (in wet places)

Lower parts sparse, much Robinia, Lonicera japonica, Sassafras, even Broussonetia. + Ailanthus around old house sites.

Monarda fistulosa in opening and along old roads.

Small pond 10 years old.

Spring and stream (permanent), below old stone house.

On lower slopes toward north is patch of young scrubby Pinus virginiana. This below bird feeding area. planted plants. This is shaly soil.

Card typed

July 22 - Wildcat Mt. n. w. of Warrenton, Fauquier Co.

41936 Galium latifolium Michx. common on rocky slopes in woods.

North of the cattle farm - gentle east slopes - second growth red oak, black or scarlet, ~~[illegible]~~ tulip. Carya.

Large area of rather gentle rolling ground with second growth, rather open, umbrella crowned trees.

On large Fagus. Carya, Quercus rubra, coccinea, alba, prinus. Liriodendron. Nyssa, Ostrya, etc.

several stems from base; roots yellow.

1961 Virginia

July 29 - Knob Mt.
Medium forest of
Quercus prinus,
Q. velutina, Q. coccinea,
Carya sp. on slopes Acer rubrum
Low forest on summit
mostly Q. prinus. rather open.

Shrub layer
Corylus
Menziesia
Acer pensylvanicum
Hamamelis virginiana
Viburnum acerifolium
Rubus
Amelanchier arborea?
Prunus serotina ~~[illegible]~~
Herbs
a Aster macrophyllus
a Solidago squarrosa
o Aureolaria virginica
c Geranium maculatum
c Festuca obtusa
o Gillenia trifoliata
~~Hamamelis virginiana~~
c Dryopteris marginalis
la Circaea quadrisulcata
o Asplenium platyneuron
o Uvularia perfoliata
c Galium latifolium
o Agrimonia gryposepala
o-c Aster divaricatus
c Helianthus divaricatus
lc Eupatorium rugosum

Shen. Nat. Park

Dwarf shrubs
Spiraea betulaefolia
Ceanothus americanus
Rhus toxicodendron
Chimaphila maculata
Vaccinium vacillans
Vaccinium stamineum
Rhus ~~canadensis~~ ~~[illegible]~~ aromatica
Rubus ~~[illegible]~~ occidentalis
Rubus argutus
Lianas + creepers
Dioscorea quaternata
Parthenocissus quinquefolia ([illegible])
~~Rhus toxicodendron~~ (stet)
Vitis (glaucous beneath)

c Pycnanthemum incanum
c Hedyotis purpurea v. tenuifolia
c Allium cernuum
~~o~~ o Lactuca floridana var. villosa
c Carex ~~[illegible]~~
c Paronychia canadensis
~~Vitis~~
~~Rubus~~
c Sanicula marilandica
la Antennaria plantaginifolia
la Galium boreale
lc Polygonum cristatum
o Viola

c Potentilla simplex ~~canadensis~~
c Poa compressa
r Asclepias quadrifolia
lc Euphorbia corollata
c Silene stellata
r Parthenium integrifolium
o Lactuca floridana
l Sedum ternatum
l Poa
l Viola
a Vicia caroliniana
c Thaspium barbinode ~~atropurpureum~~
o Smilacina racemosa
c Achillea millefolium
r Heuchera sp.
l Convolvulus spithameus
o Geum flavum
r Solidago caesia

Slopes with forest 10-15 m. tall, canopy almost closed, sparse shrubs 1.5 - 4 m. tall (Amelanchier, Cornus florida, etc.) Dense dwarf shrub layer of Vaccinium vacillans ?. with some Gaylussacia baccata, Menziesia, etc.

Shrubs
r Diospyros virginiana
o Pinus rigida P. strobus
c Cornus florida
r Kalmia latifolia
o Castanea dentata
r Ostrya virginiana

r Penstemon canescens
o Aureolaria laevigata
o Aster (Sericocarpus) ast.
lc Aster linariifolius
o Aureolaria flava
l Monotropa hypopitys
ol Danthonia
o Hieracium venosum
c Cimicifuga racemosa
o Zizia
r Zygadenus
r Melanthium hybridum

Summit forest low, 5-8 m. tall, mostly Quercus prinus, rather open, esp. locally, Vaccinium abundant. Many

1961

Sample typed

July 29 - Knob Mt.
in mixed oak forest on slopes

41937 Vicia caroliniana Walt.
2 very common generally
3 38 Sanicula marilandica L.
common
1 39 Hedyotis purpurea var. tenuifolia
common

3 40 Aster infirmus Michx.
occasional
3 ~~41 Aster schreberi~~ ?
~~abundant~~

3 41 Aster schreberi Nees ?
abundant
in low oak forest on summit
2 42 Polygonum ~~dumetorum~~ cristatum Engelm. & Gray
occasional
1 {43 Galium latifolium Michx.
1 {44 Galium latifolium Michx.
~~45~~ common generally
3 45 Bromus purgans L.
common
2 46 Helianthus divaricatus L.
common
1 47 Polygonatum
rare
1 48 Viola triloba var. dilatata (Ell.) Brainerd.
rare
2 49 Carex laxiflora Lam.
common
1 50 Taenidia integerrima
occasional

2750'
840 m

weak, prostrate to
ascending.

flowers pale ~~[illegible]~~ lavender,
(note difference in
corolla size on two plants)
several stems from
base; rays white, broad,
disk greenish yellow.
leaves prominently ~~[illegible]~~
areolate beneath.
ligules pale lavender
disk yellow turning reddish;
involucre cylindric.
Twining on herbs; flowers
white; fruit lustrous.
~~common generally~~; tufted,
flowers reddish.

scattered erect culms,
panicle drooping or arcuate.
erect, rays bright yellow,
disk dull yellow.
lvs. glabrous but fls. solitary.

leaves erect

leaves green, not glaucous.

leaves glaucous beneath.

1961 Virginia — Shenandoah Nat. Park

Labels typed

4	41951	Vitis aestivalis var. argentifolia (Munson) Fern. local, on ground	vine; leaves glaucous beneath, rusty pubescent; fruit immature.
2	52	Viola eriocarpa var. leiocarpa occasional	plant erect, fruit erect.
1	53	Carex stipata common	tufts very loose, culms spreading.
1	54	Carex common	tufts very loose, culms spreading.
2	55	Poa rare	culms erect, solitary.
3	56	Galium boreale L. very common	shoots erect.
1	57	Zygadenus rare	erect; ~~petals~~ tepals white with green heart-shaped glands.
2	58	Aureolaria flava occasional in woods on slopes	corollas caducous, yellow, villous in line within.
1	59	Melanthium hybridum rare	erect; flowers greenish.
1	60	Galium boreale common	erect
2	61	Geum rare	petals minute, yellowish.
1	62	Rubus occasional	stems ascending; fruit not quite ripe.
1	63	Lactuca floridana v. hirsuta rare	erect, buds purplish.
2	64	Vaccinium vacillans abundant	bushes 2-4 dm. tall; fruit pleasantly acid, fragrant.
1	65	Rubus occasional	vines procumbent; fruit black.
1	66	Heuchera rare	
1	67	Rubus common	primocanes somewhat ascending; floricanes arching and then prostrate.

To p. 136

1961 Virginia

Road clearing, partly shaded but brush cleared out -

Pedicularis canadensis
Prunella vulgaris
Poa compressa
Geranium maculatum
Viola sp.
Ceanothus americanus
Clinopodium vulgare
Solidago
Dioscorea quaternata
Galium circaezans
Antennaria plantaginifolia
Achillea millefolium
Veronica officinalis
Hedyotis purpurea v. tenuifolia
Vicia caroliniana
Rubus hispidus?
Circaea quadrisulcata
Galium triflorum
Carex
Sanicula marilandica
Carex laxiflora
Festuca obtusa
Chrysanthemum leucanthemum
Uvularia perfoliata
Oxalis
Thaspium
Erigeron strigosus
Trifolium agrarium
Dianthus armeria
Lactuca

Shenandoah Nat. Park

1961 Virginia

Labels typed

41968 (cyp.)
1 rare
1 69 Amelanchier
occasional
3 70 Lactuca floridana
locally common
3 71 (grass)
very local
3 72 Monotropa hypopitys v. americana
very local
1 73 Panicum
local
1 74 Danthonia spicata
locally common
1 75 Zizia
occasional
2 76 Lactuca
rare in old [illegible] fire road clearing

July 30 - Bear Wallow
in second growth woods
on rocky ground.
1 77 Zygadenus glaucus
rare

1 78 Lilium philadelphicum
rare
1 79 Bidens bipinnata
rare, on bare rock along
wood road.
7 80 Scutellaria ovata var. ovata (Hill)
rare, on bare rock along
wood road.

Shenandoah Nat. Pk.

tufted

shrub 1.5 m. tall;
fruit red.
erect; buds purple.

spreading by rhizomes,
forming loose patch, the
few flowering culms erect.
erect; plants straw colored.

stems erect; fruit green,
strongly aromatic-
erect (branches from a
cut off base); flowers yellow.

erect. ~~pet~~ tepals
white with heart-shaped
green gland.
flower erect, orange-red,
dark spots near base of blade
of tepals.

~~the~~ flowers purple and
white.

1961 Virginia

Label typed

July 30 – Matthews arm Fire Trail gate, foot of Matthews arm ridge.

41981 Vaccinium corymbosum? rare in dry secondgrowth forest

Shenandoah Nat. Park

sterile shrub 1 m. tall. leaves glaucous beneath.

1961 Hawaiian Is.

Aug. 10 - Hilo
Open areas, cleared of buildings by 1960 Tsunami; luxuriant weed growth.

41982 Trema
2 rare
3 83 Desmodium
common
3 84 Euphorbia
abundant
2 85 Euphorbia
occasional
2 86 ~~S~~ Spermacoce suffruticosa
occasional
2 87 Ageratum
common

Aug. 10 - 7 mi. above Hilo on Saddle Road
along road in low open ~~sh~~ Metrosideros scrub
3 88 Melastoma malabathrica
common

Aug. 10 - Saddle Road 13.5 mi. above Hilo
2 89 Carex alligata Boott
local in wet depression in rough lava in lehua forest
2 90 Nephrolepis cordifolia
common in lehua forest on rough lava
2 91 Rhynchospora
common in open scrub on lava

Hawaii

5 m. Most of weeds seen about twice normal size.

shrub 1.5 m. tall.

branching herb ~~1.5~~ 1 m. tall, (others seen twice that) no anthocyanin

moderate anthocyanin

branched at base

flowers blue - lavender. plant to 1 m. tall, aromatic.

500 m.

shrub 1.5 m. tall; petals bright rose.

1065 m.

branching from base, culms ascending.

fronds erect.

1961 Hawaiian Is.

41992 Cyperus cyperoides
1 occasional in open power line right of way on lava.

Large area where cars can park on rt. side of road about .4-.5 above m.p. 13. (.3,5 mi above place picked for stop on trip).
Plants in disturbed area and along trail on lava.

c Paspalum dilatatum
o Nephrolepis exaltata
o Rubus rosaefolius
lc Rhynchospora lavarum:
o Sporobolus africanus
r Stachytarpheta dichotoma
o Epilobium oligodontum
o Spathoglottis plicata
c Anthoxanthum odoratum
c Sacciolepis contracta
r Conyza canadensis
o Conyza bonariensis
o Geranium carolinianum var. australe
l. Oxalis corniculata
l.a. Axonopus compressus
c Sphenomeris chinensis
lc Buddleia asiatica
c Pluchea odorata
c Andropogon virginicus
c Hypochaeris radicata
a Hypericum japonicum
o Setaria geniculatum
r Eupatorium riparium

la Cuphea carthaginensis
l.c. Cyperus polyanthos

heads globose.

Just below 4000'

Open lehua with herb layer
a Machaerina angustifolia
a Lycopodium cernuum
a Metrosideros collina
c Vaccinium reticulatum
a Gleichenia linearis v. tomentosa
r Dubautia scabra
c Sadleria cyatheoides
c Hedyotis centranthoides
c Polypodium pellucidum
lc Coprosma ernodeoides

Area of denser forest around lava ravine with wet bottom
a Metrosideros collina
c Cheirodendron trigynum
o Broussaisia arguta
Thelypteris cyatheoides
Myrsine cf. lessertiana
Myrsine cf. sandwicensis
Vaccinium calycinum
Nephrolepis cordifolia
Peperomia sp.
Nertera granadensis var. insularis
Gouldia terminalis
Cuphea carthaginensis
Coprosma rhynchocarpa ?
Psilotum sp.

Aug. 10 – Kulani Road, 850 m.
– 3 mi. below Prison Camp, in dense wet Metrosideros forest on old lava.
Trichomanes baueranum
Ophioglossum pendulum
Polypodium saffordii
Polypodium tamariscinum
in tall dense mossy Metrosideros forest.

41993 ~~Hymenophyllum~~ Mecodium recurvum (Gaudich.) Copel. det. D. Palmer 8/96
1 on fallen tree trunk

1 94 ~~Hymenophyllum~~ Sphaerocionium lanceolatum (Hook. & Arn.) Copel. Det. D. Palmer 8/96
on fallen tree trunk

1 95 ~~Polypodium saffordii~~ Oligadenus (= Adenophorus) pinnatifidus Gaudich. det. D. Palmer 8/96
on fallen tree trunk and erect sapling.

Aug. 10 outer Edge of Kilauea Caldera 1200 m.
in low open Metrosideros forest

1 96 Deschampsia nubigena erect
common

1 97 Rhynchospora Tufts
common

1 98 Luzula hawaiiensis
occasional

2 99 ~~Gleichenia linearis~~ Dicranopteris linearis (Burm. f.) Underw. Det. D. Palmer 8/96 var. tomentosa
forming a low tangle locally

42000 Lacciolepis contracta
1 common locally

1961 Hawaiian Is.

39.5 first belt of forest
40.7 enter forest
41.8 first stop.

Road to Dam -
young koa showing both kinds of leaves. on + at stream.
Anthoceros on cuts.
Thelypteris cyatheoides
Dubautia cf. plantaginea
Thelypteris sp.
Athyrium poiretianum
Coprosma sp
Elaphoglossum conannum
E. hirtum v. micans
Polypodium saffodes
Asplenium sp
Peperomia sp
Hymenophyllum recurvum
Eurya sandwicensis
Smilax sandwicensis
Clermontia
very abundant
Myrsine cf. lessertiana
Pelea cf. clusiaefolia
Myrsine sp. (small lf.)
Uncinia uncinata

Maui

Haleakala Road
Jct. 56.9
view 59.6
Lepechinia 65.5 small side rd. to it.
49.7 bridge 66.1

Hosmer Grove
native veg. - a tall scrub of Sophora, Styphelia, Vaccinium reticulatum, Coprosma montana, Vaccinium berberidifolium, Rubus macraeana? Fragaria chiloensis, Santalum haleakalae; Geranium cuneatum v. tridens
, galls caused by gall fly not wasp.
Pamakani now flowering at high elevations & not lower down. (lower edge of scrub belt)

Pinus strobus
Cupressus arizonica
Hosmer Grove - Chamaecyparis lawsoniana
Libocedrus decurrens
Eucalyptus globulus
Eucalyptus pulchella
Cedrus deodara
Pinus coulteri Pinus ponderosa
Picea cf. rubens Picea glauca
Pinus contorta Juniperus virginiana
Cryptomeria japonica
Pseudotsuga menziesii
Pinus tabulaeformis
P. sylvestris

1961 Hawaiian Is.

Aug. 11 - Hosmer Grove, near Puu Nianiau, n.w. slope Haleakala

~~4200~~ in native dense scrub among planted trees

4200 1 Vaccinium reticulatum very common

1

1 02 Vaccinium berberidifolium? common

Aug. 11 - Waikamoi Stream near dam, north slope of Haleakala Dome. in thick mossy ~~[illegible]~~ forest

1 03 Uncinia uncinata rare, on mossy bank

1 04 Juncus bufonius L. ? ~~common~~ occasional on wet roadside

1 05 Juncus bufonius L. abundant in road

1 06 Polypodium pellucidum? epiphytic on tree trunks

1 07 Trichomanes epiphytic on tree trunks

1 08 Coprosma rare

Maui

2070 m.
6800'

erect shrub 1 m. tall, leaves strongly glaucous; corollas not strongly tapering apically; firm, dull red, paler at base, lobes green.

~~shrub 0.4 [illegible] dm. tall~~

shrub to 0.4 (to 0.5) dm. tall, not glaucous, not flowering at this season, fruit red.

1250 m.

tuft

blade flat.

small tree 5 m. tall; fruit green.

1961 Hawaiian Is.

Aug. 11 – West Maui, n. coast, from air.
Cliffs of whitish material around n.e. side.
Lower ridges, above the cliffs and on westward very seriously eroded.
A dirt road ~~circles~~ ~~the~~ follows the coast at a fairly low elevation.
Some pineapple fields on lower slopes toward n.w. corner.
N.w. side has no cliffs, low cultivated foot slopes, almost a coastal plain. Red soil

Aug. 20 – Kaena Point, Oahu
on dunes of [illegible] lime sand, exposed to wind and spray

42009 Scaevola sericea Vahl
1 abundant, binding sand
1 10 Heliotropium anomalum H.& A.
common
1 11 Vitex ovata
locally common
1 12 Sesbania tomentosa
very locally common
+
2 13 Boerhavia repens L.
rare
1 14 Capparis sandwichiana DC.
very rare, where sand is thin on rocks

West Molokai from air.
s.w. coast – gray bushes (Prosopis?) forming small patches, probably grass beneath them, red soil between them.
No appearance of green at all.

5-10 m.

depressed shrub,
fruit white, fleshy.
– depressed dwarf shrub,
– silvery; flowers white.
prostrate shrub
with ascending
– twigs, flowers purple.
prostrate shrub,
flowers bright
→ – salmon - vermillion.
prostrate forming mats,
– leaves white beneath.
depressed shrub; flower
wilted; fruit green but seeds apparently ripe.

1961 Hawaiian Is.

Sept. 2 – Honolulu, just above of corner of Nehoa ~~School~~ St. and Pensacola Ave. in thicket in vacant lot

42015 Prosopis pallida var. inermis (HBK) Fosb.
4 common with spiny form.
6 16 Basella?
abundant

Oahu

45 m.

small spreading flat-topped tree.
– clambering, tangled twiner, enveloping bushes. Staminate only seen.

1961 Hawaiian Is

Sept. 3 Auwahi
weeds seen in addition to list
Festuca myuros
Chenopodium ambrosioide

Composition of forest changes downward – Santalum haleakalae drops out, Sophora drops out – Diospyros comes in, becomes common. Dracaena becomes very common. Osmanthus and Dracaena become commonest trees. Lantana becomes more and more abundant.

~~4420~~17 Sept. 3 Auwahi, south slope of Haleakala
in dry open forest on
4 20017 Alectryon macrococcus
4 one tree seen
3 18 Pouteria auwahiensis (Rock) Fosb.
occasional
4 19 Myrsine
occasional
1 20 Osteomeles anthyllidifolia
occasional (very common higher up.)
~~21 Santalum ellipticum~~
3 21 Pouteria auwahiensis (Rock) Fosb.
occasional

as trees become sparser Lantana is dominant, practically a pure scrub. Definite altitudinal gap bet. the dry sclerophyll forest and the deciduous forest of Erythrina, Reynoldsia, etc. This includes considerable Diospyros and some Aleurites.
Toward lower part of sclerophyll, Metrosideros fairly common. A different Myrsine than above.
At water tanks and below Santalum ellipticum in Lantana scrub.

1000–1200 m.

"aa" (rough) lava.

Radlk. small tree

tree with round crown 6–8 m. tall.
— small tree, ripe fruit black, depressed globose.
(Sm.) Lindl. shrub 2 m. tall, ripe fruit white, fleshy.

small tree 6–8 m. tall, fruit yellow, turning orange.

1961 Hawaiian Is.

42022 Cocculus
1 occasional, twining over
low bushes and on rocks
1 23 Pelea
~~occasional~~ rare
2 24 Wikstroemia
rare var. Ovalifolia (det. B.C. Stone, 1967)
2 25 Pelea grandiflora (Hillbr.) St. John var. (Hillbr.) St. John
rare

4 26 Myrsine
occasional
3 27 Carex
very local, small patch

3 28 Pelea multiflora J. F. Rock
occasional
2 29 Passiflora
common generally

3 30 Alyxia olivaeformis Gaud.
~~[illegible]~~ rare, under trees
2 31 Charpentiera obovata Gaud.
occasional
3 32 Chenopodium ~~botrys~~ carinatum L.?
occasional
3 33 Pisonia forsteriana!
rare

same - in Lantana scrub 900 m.
1 34 Polypodium Thunbergianum (Kaulf.) C. Chr.
occasional on bare lava
rock.

Maui

twiner, leaves somewhat
glaucous, flowers greenish
white.
— small tree.

tree-like shrub, 2.5 m.
— tall; fruit green.
sprawling shrub,
leaves tending to
— be revolute.
small tree 6 m. tall,
— fruit green.
culms in small tufts
well separated,
— spreading by rhizomes
small tree, flowers
— greenish.
vine, climbing
over bushes; flowers
white, sepals green without,
— fruit green, soft.
shrub 0.3 m. tall;
— flowers orange without.
small tree.

small tree; flowers
pale bronze green. (same
tree as #41512a)

dried and curled
in dry season.

same - on open rough lava in [illegible] deciduous woodland

42035 Capparis sandwichiana DC.
1 one large plant seen hanging over low cliff

450 m. ~~800 m.~~ spreading shrub flowers faded, buds white, fruit immature

Sept. 3 - Ulupalakua in sparse pasture on lava flow.

600 m.

1 36 Polycarpaea
common

1 37 Lepidium
common

2 38 Bocconia frutescens L.
— very local

shrub 2 m. tall, inflorescence pendent.

from p. 156, bottom

900 m.

0.5 34a Santalum ellipticum Gaud.
occasional in Lantana scrub

small tree 4 m. tall; flowers pale green, fragrant.

1250 m.
4000'

Sept. 4 - Waikamoi Stream, Pipe Line Trail.

1 39 Plantago
in wet trail in montane rain forest.

1 40 Astelia forbesii Skottsb.
occasional, on fallen logs.

flowers greenish white.

1 41 Stenogyne cf. scrophularioides
on ground in dense wet forest

creeper, sterile.

1961 Hawaiian I.

~~Aug~~ Sept. 4 - Haleakala, near summit
bare slopes of broken
lava and cinders.

42041a Erodium cicutarium
rare

" 42 grass
rare

" 43 Dubautia menziesii Gray
very common.

" 44 Dubautia menziesii Gray
common

~~Aug~~ Sept. 3 - Lower south slopes of Haleakala, several miles beyond Ulupalakua on main road.

Erythrina and Reynoldsia both leafless or nearly so. Erythrina flowering. Reynoldsia in bud. Budding inflorescences while still small embedded in a hard transparent gum. This forming a thin coating when infls. expand.

Diospyros common here, also, but general aspect is of a deciduous forest. Only scattered trees and clumps of trees left now, in rough places, ravines, etc.

Maui

7950 m.

spikelets dark purple

Hunnemania locally abundant, at least along road, for some distance. Bocconia much more local, occasional just south of Ulupalakua.

~~Aug~~ Sept. 3 - east of Makawao, toward Kula.

Tibouchina semidecandra growing in yard of house.

None of the melastomes seems to be well-established on Maui, at least yet.

Sept. 5 - Malamaki Forest Reserve, n. of Mackenzie Park, just back of sea cliffs

Collapsed lava tube - two holes -

Brassaia actinophylla
Pipturus albidus
Nephrolepis hirsutula
Polypodium scolopendria
Adiantum capillus-veneris
Cordyline terminalis
Sadleria cyatheoides

Sept. 5 - inland from Kalapana on upper road is an excellent piece of decent mature undisturbed forest - Tall lehua with much Freycinetia. Should be examined carefully at earliest opportunity.

Generally throughout Puna Andropogon virginicus is just about flowering. This is taller than the ordinary e. U.S. form.

Arundina is most conspicuous and abundant. flowering everywhere.

1961 Hawaiian Is.

Sept. 6 – Kilauea Homesteads,
Wright Rd. Kilauea

47045 Asplenium lobulatum Mett. Det. D. Palmer 8/96
3 occasional, on ~~logs~~
fallen fern trunks
in Cibotium forest.

Sept. 6 – Stainbach Highway
to Kulani. at Old Flume Rd.

1 46 ~~sp~~ Psidium cattleianum f. lucidum
occasional in Metrosideros forest

1 47 Labordia
rare in wet Metrosideros forest

Sept. 6 – Lower part of
Stainbach Highway to Kulani,
just above Hilo.

2 48 Melochia
abundant along road
in mixed secondary thickets

Sept. 6 – Stainbach Highway
to Kulani. 1½ mi. above Old
Flume Rd.
in dense wet Metrosideros forest

1 49 Psilotum complanatum Sw. Det. D. Palmer 8/96
occasional on tree fern trunks

1 50 Cyanea
rare

3 51 Cyrtandra
common in undergrowth

---

600 m.

small tree; fruit ~~sp~~ globose,
pale yellow when ripe.

shrub about 1 m. tall,
leaves very pale beneath.

60 m

Tree 4 m. tall (others to 10 m.),
dried fruit only.

670 m.

unbranched; leaves pale
beneath, flowers purplish
without, greenish white
within.

dark green, shrubby at
base; leaves pale beneath;
flowers white.

1961 Hawaiian Is. –

Sept. 6 – Road from Kulani
to Mauna Loa, at edge of
1942 Lava Flow
in open Metrosideros forest
on old aa lava.

42052 Oreobolus ?
5 common in crevices and
depressions on rock

1 53 Korthalsella cylindrica
parasitic on Metrosideros

4 54 Vaccinium
rare

pahalae Skottsb.
1 55 Vaccinium ~~peleanum~~ Skottsb.
common

1 56 Vaccinium reticulatum Sm.
common

1 57 Vaccinium peleanum × reticulatum ?
common

1 58 Senecio sylvatica ?
rare

1 59 Centaurium umbellatum
occasional

1 60 Rhynchospora lavarum ?
common

1 61 Uncinia uncinata
common, terrestrial

2 62 Elaphoglossum wawrae (Luerss.) C. Chr.
local, abundant on peaty
hummocks
Det. D. Palmer 8/96

1 63 Dubautia scabra (DC.) Keck
common on bare 1942 lava at edge of road

Hawaii

5860'
1480 m.

dense cushions

joints terete.

shrub; leaves subcoriaceous,
subglossy beneath;
calyx flaring, corolla
green, cylindric.
— shrub 0.3 m. tall,
leaves concave beneath
fruit immature
— shrub 0.3 m. tall,
leaves flat; fruit orange red.
— leaves almost flat;
fruit dark red.
— erect. flowers yellow.

flowers pink.

tufts

loose, small, very
spreading tufts

densely branched dwarf shrub;
flowers white.

1961 Hawaiian Is.

Sept. 6 - about 1 mi. w. of Kulani Prison Camp on road to Mauna Loa.

42064 Rumex gigantea
2 in cleared pasture in ~~[illegible]~~ Metrosideros forest (rainfall approx. 100 inches)

Sept. 7 - Hilina Pali, Kau Hawaii Volcanoes National Park

3 65 Andropogon glomeratus
abundant generally on ash-covered lava flow.

[illegible]

Sept. 7 -
↓
6 Kilauea Iki - coll G. Ruhle
anemone japonica
local on ledges along trail
2 Dodonaea viscosa

Sept. 8
1 ↓ Puu WaaWaa - E. C. Evans III
(comp.)
abundant on flats

M. Buehringer
3 Polygonum

—

Sept. 8 - City of Refuge, Honaunau South Kona
2 66 Cyperus compressus L.
in crevices in lava rock.

1500 m.

tangled, vine-like, flowers brick red.

680 m.

erect, culms in small groups.

1180 m.

flowers said to be white.

—

erect, flowers yellow

1 m.

Sept. 8 - just n. of Hutchinson Mill, Naalehu

Aa flow, very rough with very sparse vegetation of Canthium, Myoporum, Tephrosia, Plumbago, Dryopteris, Waltheria, Schinus, Erythrina, Nephrolepis cf. hirsutula, Metrosideros, Pluchea odorata, Lantana.

Great transverse fissures in lava flow. Also great smooth boulders up to 1-2 m. diam. embedded in the fantastically rough aa. The lava forming crags and pinnacles to 1-2 m. tall, fissures to 3-4 m. deep.

Sept. 8 - Keauhou Bay, South Kona

42067 Capparis sandwichiana
3 common locally on aa lava

25 m

Sept. 9 - Keauhou Road up Hualalai

spreading shrub 1 m. tall, flowers faded.

Sept. 8 - Manuka Park, Kau
in dense Metrosideros
forest on aa lava

4 42068 Antidesma pulvinata
uncommon
1 69 Antidesma platyphylla
uncommon
1 70 Antidesma kapuae
uncommon
1 71 Lycopodium phyllanthum
locally common, terrestrial,
1 72 Wikstroemia
occasional
~~73 Annona~~
1 73 ?

3 74 Lipochaeta
rare
~~75~~
1 75 Pelea oblongifolia A. Gray
rare
1 76 Gouldia terminalis var.
occasional
1 77 Gouldia terminalis var.
occasional
1 78 Psychotria hawaiiensis
common

same loc. - on deep weathered
soil between flows of aa, in
guava forest
3 79 Annona
rare

---

500 m.

sterile sapling

sterile small tree

steril slender small tree.

erect, arching at summit.

shrub 3 m. tall. slender,
sparsely branched.

very slender elongate
sprawling shrub, 1.5 m.
tall; rays yellow.
sprawling slender
shrub; flowers pale green.
shrub; ripe fruit blue.

slender shrub 2.5 m. tall,
fruit immature.
shrub 2 m. tall;
flowers white.

500 m.

~~sh~~ sterile shrub
2 m. tall; leaves rather
glaucous beneath.

1961 Hawaiian Is.

Sept. 8 – on 1868 Lava Flow where highway crosses it, Kau on almost bare pahoehoe lava — 500 m.

42080 Gnaphalium sandwicense var. kilaueanum — Deg. & Sherff
1 rare

1 81 Peperomia leptostachya?
rare

1 82 Picris hieracioides??
rare

1 83 Lycopodium phyllanthum
rare

Sept. 8 – just north of Hutchinson Sugar Mill, Honuapo, north of Naalehu, on sparsely vegetated very rough aa lava — 50 m. Kau

2 84 Tephrosia purpurea
very local

1 85 Myoporum sandwicense
occasional

Sept. 9 – Kaupulehu Road up Hualalai, North Kona — 1500 m. 5000'

3 86 Gnaphalium sandwicensium gray
on loose lapilli along road

4 87 Hypericum perforatum
colony in grazed flat

same – in sparse small Metrosideros forest on somewhat rough lava flow.

1 88 Geranium carolinianum var. australe
common along road

Hawaii

erect; flowers yellow

erect, arched at tips.

erect; flowers whitish.

shrub 1.5 m. tall; leaves fleshy; fruit pinkish, fleshy.

large plant, much branched near base

erect, fls. yellow.

prostrate, flowers pink.

1961 Hawaiian Is.

42089 Vaccinium reticulatum Sm.?
1 90 Vaccinium
1 91 Vaccinium reticulatum Sm.
1 92 Vaccinium pahalae Skottsb.

4 93 Vaccinium berberidifolium
very local

1 94 Styphelia tameiameiae
common

1 95 Styphelia tameiameiae
common

2 96 Vaccinium reticulatum Sm.
common

2 97 Vaccinium pahalae?
local

1 98 Fragaria chiloensis
occasional

1 99 Veronica serpyllifolia
occasional on loose
lapilli on roadside

42100 Juncus bufonius L.
1 rare on loose lapilli on roadside

Hawaii

— low bush, fruit dark red.
} with — fruit light red
} Tomlinson — fruit scarlet
fruit scarlet: corolla
broadly urceolate,
not much constricted
at top, green with
reddish patches.
— low bush, somewhat
tangled; corolla red,
— subglobose.
shrub, 1 m. tall;
— fruit dark maroon, ~~subg~~ depressed globose
shrub 1 m. tall;
fruit crimson, slightly
— depressed globose.
shrub 3-4 dm. tall;
leaves slightly glaucous;
corollas urceolate, tapering
somewhat apically, red
with green lobes; fruit
— dark red.
low tangled bush;
— fruit bright red.
leaves ascending.

prostrate. fls. pale blue.

1961 Hawaiian Is.

Sept. 9 - just below summit of Hualalai on Kaupulehu (west) side. on ash accumulated on and around pahoehoe lava.

42101 1 Gnaphalium japonicum
common

3 02 Carex macloviana
common

4 03 Tetramolopium humile
common

1 04 (grass)
rare

3 05 (grass)
occasional

1 06 Trisetum glomeratum
occasional

2 07 (grass)
occasional

1 08 Achillea millefolium
rare

1 09 Gnaphalium purpureum
occasional

1 10 (grass)
occasional

1 11 Sisyrinchium acre
common

Sept. 9 - ~~north~~ east of summit of Hualalai

1 12 Geranium cuneatum
occasional in scrub

2375 m.

low spreading clumps, dead in center.

rays white.

flowers yellow

2160 m.

shrub 0.8 m. tall, leaves green. flowers white.

1961 Hawaiian Is.

Sept. 9 – Keauhou Road to
Hualalai

42113 Osteomeles anthyllidifolia
1 occasional in scrub
4 14 Dubautia ciliolata (DC.) Keck
common in scrub
1 15 Polycarpon tetraphyllum
rare on open ground

Sept. 9 Keauhou 2, Road
up Hualalai
in low rather open Metrosideros
forest, ground mossy
3 16 Stenogyne
locally common
2 17 Rubus macraei
occasional
1 18 Dubautia scabra
occasional
1 19 Liparis hawaiiensis
very local
2 20 Vaccinium calycinum
common

same – openings
6 21 Hedyotis centranthoides
common

same – at gate at lower
edge of forest
1 22 Mucuna
climbing in thicket

1200 m.

shrub

shrub, heads yellow.

1050 m.

corollas bright leaf purple;
— fruit greenish black, fleshy.
sterile, unbranched.

subshrub mostly
— rather alternate; heads white.
in fruit only.

slender weak shrub
to 4 m. tall.

1000 m.

sparsely branched
shrubs 1-2 m. tall; flowers
purple without, green within.

400 m.

vine, flowers chartreuse

Sept. 10 – road to Waimea, 13 mi. from Kailua – area of dry forest recently burned over – trees appear dead. 14 mi. – Erythrina grove.

Sept. 10 – Puu Kawaiwai

Enclosure of a few acres with remains of a dry woodland – a few still living trees of Acacia koaia. Myoporum, Nototrichium sandwicense, Osmanthus, ~~O~~ Myrsine sp., Xylosma hillebrandii, Osteomeles, Sophora, [illegible], Cynodon, Bromus catharticus?

Chenopodium oahuense

1961 Hawaiian Is.

Sept. 10 - above Puu Kawaiwai, Kohala 950 m.

on dry weedy slope with scattered small trees.

42123 Acacia koaia
3 occasional

2 24 Korthalsella complanata
parasitic on acacia koaia (#42123)

3 25 Apium petroselinum L.
abundantly naturalized

3 26 Xylosma hillebrandii Wawra
2 trees, ~~seen~~ only, seen, in ravine

3 27 Acacia koaia Hbd.
occasional

1 28 Osmanthus sandwicensis (A. Gray) Knobl.
two trees, seen in ravine

2 29 Chenopodium oahuense Meyen
rare

2 30 Myrsine
occasional

1 31 Acacia koaia Hbd.
occasional

3 32 Lepidium
locally common

Sept. 10 - Head of Alakahi Gorge, Waipio Valley, Kohala Mts. 1180 m.
above Waimea
in wet scrub vegetation on plateau

1 33 Asplenium

small spreading tree, apparently unhealthy.

dull dark olive green.

erect, flowers greenish, plant aromatic when broken.

small tree 5 m. tall, young growth and petioles red; flowers staminate.

small spreading tree; flowers light yellow, somewhat fragrant.

small spreading tree, fruit blue-black when ripe.

shrub 1 m. tall.

tree 5 m. tall, leaves coriaceous.

from very young tree

4 2134 Polygonum
4 abundant in wet road
1 35 Peperomia
epiphytic on mossy shrub
4 36 Hydrocotyle sibthorpioides var. oedipa Deg. & Greenw.
local on open Sphagnum
cushions.
2 37 Ilex anomala
common
1 38 Ascarina compressus?
small patch in Sphagnum bog.
3 39 Clermontia
occasional

3 40 Myosotis
local along old road
4 41 Cyperus
abundant along old road
~~42~~

same – low forest on
with P. Dansereau gentle slope
42 Cyrtandra
4 occasional

Sept. 11 – Saddle Road 13.4 mi 1060 m.
above Hilo
In wet Metrosideros forest
1 43 ~~Polypodium~~ Adenophorus hymenophylloides (Kaulf.) Hook + Grev.
Det. D. Palmer 9/96
epiphytic on mossy tree trunks
5 44 Vaccinium calycinum (or dentatum?)
common in edges of
3 45 Pipturus albidus (H. & A.) Gray
occasional
2 46 Uncinia uncinata (L.f.) Kük.
rare, on mossy logs.

---

stems ascending,
flowers white.
– leaves white beneath

stems deeply buried
in Sphagnum.
– shrub 2 m. tall,
flowers white.

shrub; calyx green,
lobes unequal,
corolla purple.

shrub; flowers white;
fruit white.

fronds pendent.

erect shrub 1 – 2 m. tall,
fruits glossy, bright red,
acid and somewhat astringent.
– shrub; fruit white, fleshy.
Tufted,

1961 Hawaiian Is.

Sept. 11 –
. Goat Hill. on Kailua –
Waimea Rd. – 20 000 acres
burned last year.
Native dry forest trees
all dead as seen from rd.

(ctd. from 186)

42147 Psilotum complanatum Sw.
1 on mossy tree trunk
Det. D. Palmer 8/96

Sept. 11 – Puu Huluhulu,
Humuula Saddle

2 48 Carex
occasional in Coprosma
thicket on ~~[illegible]~~ boulder slope

2 49 Geranium carolinianum v. australe
common on bare ground

1 50 Oxalis corniculata L.
occasional, in rock crevices

5 51 Sicyos macrophyllus Gray
rare, in thicket

3 52 Coprosma montana Hbd.
locally abundant

1 53 Sisymbrium officinale L.
open ground.

1 54 Coprosma montana Hbd.
edge of thicket

1 55 Malva parviflora L.
open ground

1 56 Trifolium arvense L.?
common on bare ground

1 57 Geranium carolinianum v. australe
common on bare ground

---

tips of fronds pendent.

2100 m.

caespitose.

prostrate, flowers
rose pink.
– sub-prostrate

liana, 4 cm. thick at
– base, climbing in trees.
shrub 3 m. tall (others taller);
fruits fleshy, orange.

shrub 4 m. tall, erect;
– fruit fleshy, orange.
flowers pinkish, especially
veins of corolla; glabrous
within.

prostrat

#1961 Hawaiian Is.

42158 Veronica arvensis
1 in moist spot between
base of cinder cone and lava flow.
1 59 Carex wahuensis C.A. Mey.
rare
1 60 Wahlenbergia
roadside
3 61 Modiola caroliniana (L.) G. Don
common on open ground

Sept. 11 - Pohakuloa 1980 m
in open woodland of
Sophora, Myoporum
and Chenopodium
3 62 Rhamnus californicus
planted around nene
pens
3 63 Sicyos hillebrandii St. J.
rare
2 64 Bromus
abundant
5 65 Helianthus
occasional

Sept. 11 - main highway 625 m.
near Puu Waa Waa Ranch entran
3 66 Reynoldsia sandwicensis Gray
locally common

Sept. 11 - main highway 610 m.
opposite Puu WaaWaa
4 67 Nothocestrum breviflorum Gray
rare in open dry woodland on
aa lava.

flower deep purple within,
pale without.
very prostrate stems
radiating from root
crown; flowers orange
red.

shrub 1.5 m. tall;
ripe fruits fleshy, black.

vine; flower white.

dense tufts.

erect clumps 1 m. tall;
disk brown, rays bright yellow.

tree 8 m. tall; in bud only.

small spreading tree;
flowers green, deliciously fragrant.

1961 Hawaiian Is.

42168 Argemone glauca var. inermis
1 rare

Sept. 11 - Kaupulehu Forest
10 miles ~~north~~ NNW of Kailua
in open sclerophyll forest
on aa lava slope
42169 Pouteria auahiensis (Rock) Fosb.
1 occasional
1 70 Argemone glauca var. inermis
rare in openings.
3 71 Korthalsella cylindrica
abundant on certain
Diospyros ferrea trees (#42172)
2 72 Diospyros ferrea var. pubescens
abundant
2 73 Colubrina oppositifolia Brongn.
occasional
4 74 Cocculus ferrandianus Gaud.
common, tangled in shrubs

Sept. 12 - Hilo
1 75 Cestrum nocturnum L.
cultivated

Sept. 12 - Akaka Falls,
above Honokaa
in ~~Met~~ Metrosideros forest
much modified
2 76 Pteris vittata L. Det. D. Palmer 8/90
on stone wall along trail
1 77 Psilotum complanatum Sw.
very common on mossy tree trunks
Det. D. Palmer 8/90

Hawaii

flowers white.

640 m.

Tree 8-10 m. tall; fruit
yellow, not quite ripe.
erect, 2 m. tall.

branches cylindrical.

small tree.

tree 6 m. tall, fruit
immature. (note domatia).
twines, flowers whitish,
petals emarginate at tips.
(broad leaf form commoner
10 m. than narrow).
shrub 3 m. tall; flowers
pale yellow, very fragrant
at night; fruit white
when ripe.

320 m

rhizome erect, fronds
strongly ascending.

1961 Hawaiian Is.

42178 Lycopodium phyllanthum occasional on mossy tree trunks.
1

2 79 Cryptotaenia canadensis locally common along trail

all done once

Hawaii

H. & A.

1961 California

Label typed

Sept. 16 - Hayward,
Alameda Co.

~~42180~~

42180 Setaria sphacelata
4 large persistent clump
in garden

perennial; brought
accidentally with
garden plants, some
years ago, perhaps 1955,
from Turlock.

1961 Maryland

Sept. 23 - Beltz Woods
Old growth deciduous forest -

Tree layer 30 m. ±

a	Liriodendron
c	Quercus coccinea
c	Q. velutina
c	Q. alba
c	Carya sp.

Second layer 5-10 m. ±

a	Cornus florida
r	Nyssa sylvatica

Shrub layer 0.5-5 m.

c	Cornus florida
o	Acer rubrum
o	Morus rubra
o	Lindera benzoin

Ground layer

a	Cornus florida (s)
c-a	Liriodendron (s)
c-a	Parthenocissus quinquefolia (hairy)
c	Vitis sp. (green beneath)
r	Smilax glauca
lc	Botrychium virginianum
c	Quercus sp. (s)
o	Desmodium nudicaulis
r	Dioscorea quaternata (not glaucous, condensed at base but not a whorl)
o	Dioscorea quaternata var. glauca
r	Acer rubrum (s)

o	Carya sp. (s)
o	Morus rubra (s)
o-c	Cimicifuga racemosa
r	Arisaema atrorubens
lc	Sanicula sp.
r	Collinsonia canadensis
o	Sassafras albidus (s)
r	Chimaphila maculata
lc	Sanguinaria canadensis
lc	Uvularia sessilifolia
o	Uvularia perfoliata
r	Castanea dentata (sprout)
lc	Apios tuberosa
r	Monotropa uniflora
lc	Thelypteris hexagonoptera

163
50
66
42
74
53

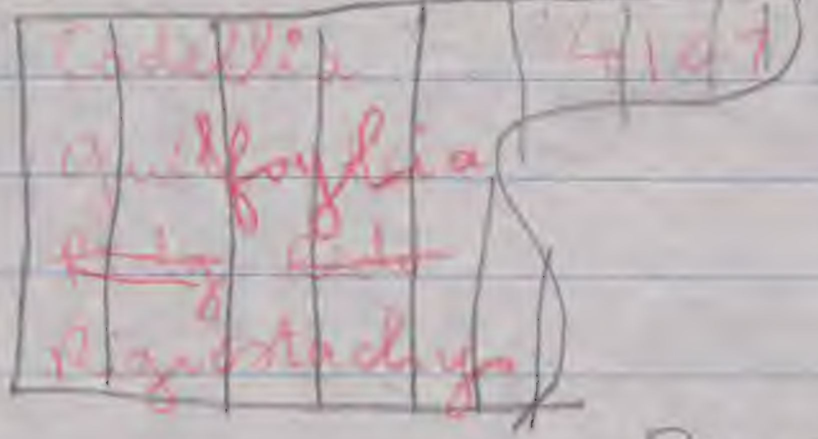
[illegible]
Div. of Fish & Game
Hilo, Hawaii

~~to~~

K.M.S. AZIZ
HOMOEO HEALING HOME,
ELEPHANT ROAD, DHANMANDI,
DACCA-2,
EAST PAKISTAN.

Dr. F. Bonet
Apartado Postal 18196
E.N.C.B
México, D.F.

put on cards


Cadellia
quilfoylia
Pityrostachys
4/1/61

Plants of Alacran
B. L. Welch in July, 1961
7/1/61

Perez I

~~[illegible]~~ Atriplex pentandra
~~[illegible]~~d Suriana maritima
Opuntia dillenii
Portulaca oleracea (?)
Sesuvium portulacastrum
Cyperus planifolius
Tournefortia gnaphalodes
? Avicennia alba
Euphorbia buxifolia

~~toila for I | [illegible]~~

~~card~~s

~~Write Stearn~~

Collections of
Sam Rainey

1957 Nevada

July - Charleston Mt

1. Jamesia americana T.+G.
2. Chamaebatiaria millefolium (Torr.) Maxim.
3 Philadelphus microphyllus Gray
4 Acer glabrum Torr.
5 Calochortus
6 Arceuthobium
7 Heuchera versicolor Greene ?
8 ?

July Desert near Mercury

3 9 (Crucifer)
4 10 Eriogonum

1957 Nevada

11 Eriogonum

12 Eriogonum

13 Gilia (Langloisia)

14 Euphorbia

15 (comp.)

16 (comp.)

~ 17 Eriogonum

18 Mentzelia

19 Baileya multiradiata

20 Arctomecon

21 Eriogonum

22 (comp.)

1958 Marshall Is.

June ~~[illegible]~~ – Glenn I. Eniwetok atoll

23 Canavalia microcarpa

5 24 Suriana maritima

Caroline Is.

June – Kusaie

.2 25 Hedychium coronarium

26 Canna

27 Wedelia biflora

28 Phyllanthus

29 Asplenium nidus

3 30 Paspalum distichum Berg

3 31 Vigna marina Burm.

32 Cyperus

4 33 Sida acuta

2 34 Vernonia cinerea

July 1 ~~Truk~~ Moen, Truk

2 35 Cassia occidentalis

36 Macaranga

1958 Caroline Is.

37 Crotalaria incana

38 Stachytarpheta urticifolia Sims

39 Torenia?

40 Passiflora foetida var. hispida Killip

41 Ixora casei ~~Hance~~

1958 Virginia Fairfax Co.

Sept. 22 Scott Run

42 Eupatorium

~~43 Eupatorium~~

1959 Virginia Fairfax Co.

Apr. 24 ~~Potom~~ Scott Run, Potomac R.

44 Ranunculus

1959 Bermuda

May 20 St. George's I.

45 Chiococca alba

46 ?

47 Buddleia

48 Oenothera

49 Asparagus

50 Centaurium

51 Sisyrinchium

52 Euphorbia heterophylla?

2 53 Juniperus ~~bermudiana~~ bermudensis

Ninth Pacific Science Co
Bangkok, Thailan
B. E. 25

Inocencio A. Ronquillo

CHIEF, SECTION OF HYDROLOGY & FISHERIES BIOLOGY

DIVISION OF RESEARCH
BUREAU OF FISHERIES

MANILA, PHILIPPINES

163
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66
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53

Ernest Kosaka
Div. of Fish & Game
Hilo, Hawaii

to

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